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The Mass Spectrometer As An Analytical Tool In The Refinery

By
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Analytical Supervisor
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Laboratory Supervisor
Richfield Oil Corporation,
Wilmington, California

This paper is being presented to show you what a Mass Spectrometer can do for a refinery. The ideas presented are based on practices used in Richfield's refinery. It seems fitting to give first some information about the M. S. and its operation in our laboratory.

How The M. S. Works

Essentially, the Mass Spectrometer is an instrument for sorting atoms and molecules. There are two vacuum pump systems; one is for the sample introduction system and the other for the analyzer tube assembly. The sample is introduced at this point if a gas, and if normally liquid, at this point. The small amount of liquid introduced changes to the gaseous state in the previously evacuated system.

By opening valves or stopcocks, the sample is introduced into an ionizing chamber where it is bombarded by electrons which cause some cracking of complex molecules and the formation of positively charged ions. These ions are sorted by means of electrical and magnetic fields. The ions in focus strike a collector plate and produce a current which is magnified by an amplifier. A photographic device makes a recording showing the different ion intensities.

In some installations, an analog to digital converter is used to either type out the corrected peak heights or to operate a key punch machine. Cards from this could be used in an electronic digital computer.

The cracking pattern of any gas depends upon its molecular structure. Molecules with different structures have different patterns. These patterns remain relatively constant over long periods of time. It is due to these facts that gas analysis is possible with the M. S. Of necessity, the patterns of the pure gases must be obtained before a gaseous mixture can be analyzed. Another property which must be obtained from the pure gases is the sensitivity. This is the divisions of peak height for a given mass per micron of pressure in the sample introduction system.

Sampling

At Richfield, all gases and hydrocarbons through pentanes are introduced into the M. S. in the gaseous phase. Before L.P.G. and similar stocks can be analyzed, a small amount must be converted into gas without changes in composition. This is done in our laboratory by using special valves.

Both of the composite valves have a small space between the stems. In sampling, liquid is trapped in this space and then expanded into an evacuated sample tube.

In sampling gases, the evacuated sample tube is connected to a line through a T. Purging is done through a hole in the side of the stopcock. Pressure is regulated by lightly holding a finger over the open leg of the T.

Instrumentation And Calculation Time, Etc.

The actual time expended per M. S. sample in Richfield's Gas Laboratory for instrumentation, peak picking, and computation is from 10 to 30 man-minutes depending upon the complexity of the sample. Developing time is telescoped by developing 9-15 charts at one time. Calculations are made with aid of an electric analog computer which is used for the solution of simultaneous linear equations. This instrument has very materially reduced calculation time.

The bulk of the control samples are handled by the day shift. To expedite the reporting of the analyses to the units, three men work together on the peak picking and calculations.

The time required for all work done by the M. S. section of the laboratory, including maintenance, preparation of calibrating gases, paper work, sampling, etc. is 1.1 man hours per sample. At the present time, nearly 1,000 samples per month are handled by two eight hour shifts.

Refinery Uses

The M. S. is the best available tool for analyzing refinery gases and

light hydrocarbon streams. When extensively used, it gives a daily picture of all these materials in a refinery. It furnishes the information necessary to predict future inventories or the changes in operations required to meet future demands. It is an aid in trouble shooting.

Control

The speed of the M. S. makes it a very attractive instrument to use for unit control. It can quickly indicate the following:

(1) The condition or health of cracking units.

(2) The split being made by light hydrocarbon fractionating towers.

(3) The amount of conversion in C_4 isomerization reactors.

(4) The amount of propylene in Polymerization Unit feed and reactor product.

(5) H_2S in Polymerization Unit feed stock.

(6) The efficiency of absorbers.

(7) Gas ratios in synthesis units.

On control samples containing butenes, it is our custom to report these as total butenes. However, a split may be given. Because the butenes have somewhat similar patterns, the M. S. accuracy on individual butenes isn't as accurate as for other gases.

Accounting

All light hydrocarbon streams and gases are analyzed by the M. S. for our Accounting Department. In many instances, the analyses also serve for control or other purposes. The Accounting Department uses the analyses for cost accounting, computation of royalties, calculation of amounts for invoicing, data posting, and the preparation of information for the Directors to use in short and long term planning.

M. S. data is also used by our Accounting Department in experimental process evaluation and for permanent process records.

Trouble Shooting

The M. S. has been an exceedingly useful instrument in trouble shooting. Some of the types of problems where we have used it are as follows:

With corrosion and hydrogen blistering, the quick, accurate analyses for H_2S, CO_2 and O_2 in streams has aided in evaluating the sources of these troubles. The analysis of hydrogen probe or blister gases reveals whether decarbonization is taking place. That is shown by the presence of methane in the hydrogen.

In phosphoric acid catalyst poisoning the M. S. can be very useful in showing if H_2S is present in the feed stock.

In cracking catalyst poisoning, the M. S. analyses will show how the product distribution is off and how the through-put is suffering. Some keys which directly indicate poisoning are the olefin to iso ratio, the hydrogen to methane ratio, the hydrogen to C_2 ratio and the gas gravity. These may all be calculated from M. S. analyses.

Process Evaluation

To be effective, any process evaluation where gases or light hydrocarbons are involved must have accurate analyses of these materials. Fortunately, the M. S. pretty well fills the bill. Specific usages are as follows:

A method of ascertaining the optimum conditions in an existing process is to make a change in the operating conditions and follow the results with the M. S. and any other applicable tools.

Where M. S. control analyses are made frequently, an involuntary change in a process may be automatically followed and the changes evaluated.

M. S. analyses have been a necessary adjunct to Pilot Plant tests for evaluating operating variables.

In the design or installation of centrifugal gas compressors, the mass of the gases must be considered. Our engineers are now using M. S. analyses of gas streams in order to evaluate how specific compressors would perform with these gas streams. In addition, they feel that an improperly monitored change in operation could very possibly result in poor compressor results.

In D. E. A. tower operation, the composition of the gas feed can be found by M. S. analyses and from this the proper operating temperature ascertained. As a check on this, the gas from the D. E. A. reclaimer can be analyzed.

Exchanges—Sales

In sales or exchanges, our M. S. operators stress accuracy. This is done in the following manner. Where possible, samples of this nature are accumulated over a period of time and run concurrently with new calibrations for all gases involved.

Samples which must be run frequently have calibrations run at intervals which are shorter than for other materials.

Air Pollution

With reference to air pollution, petroleum refiners are sensitive to the word hydrocarbons. The M. S. is sensitive to hydrocarbon compounds. With special sampling techniques, it will reveal very minute concentrations of these compounds. This makes it a very valuable tool for the refiner to use in air pollution work.

The M. S. has been used in the identification and quantitative estimation of nearly all materials put to the atmosphere by our company. In addition to a host of other types of samples, automobile exhaust fumes have also been examined in this respect.

A common method of sampling for for such low concentrations of hydrocarbons consists of drawing the gases suspected through a trap immersed in liquid nitrogen. A sample of the contents of the trap is subsequently admitted to the M. S. for analysis. Our air pollution engineer sums up air pollution analyses in this way, "No air pollution reports are possible without the M. S. in our refinery."

M. S. Restrictions

Although the M. S. is a fast, versatile, gas analyzing instrument, it isn't without drawbacks. Because of its complexity, the possibility of trouble is not insignificant. Our down time, due to trouble shooting and maintenance, is about 15% of the total assigned operating time.

When paraffins are present in a gas, the M. S. analysis is not very reliable for small amounts of olefins: i.e., less than 1%. A small amount of carbon monoxide is not detectable in the presence of other gases which contribute to mass 28. When large amounts of six carbon-plus hydro-

(Continued on Page 20)

Blanketed Base Pans and Automatic Sentries Push Service Dates Apart

Service dates skip months instead of days where operators have Minneapolis-Moline long-run oil field engines. MM exclusive water-jacket base pan with large built-in filters keep engine and lube oil at constant temperature under any load or weather condition.

Automatic control of crankcase temperature prevents sludging and enables more effective filtering. The high efficiency of MM exclusive vacuum crankcase ventilation is obtained by blanketing the base pan with engine water. This holds crankcase vapor above the dew point so that (instead of condensing and forming sludge) it is withdrawn.

Added advantages of MM long-run design are extra large permanently lubricated bearings, sealed pressure cooling with water by-pass and thermostat control, built-in oil-flow controllers and automatic sentries —safety cutouts that prevent damage in case of low oil pressure or excessive water temperature.

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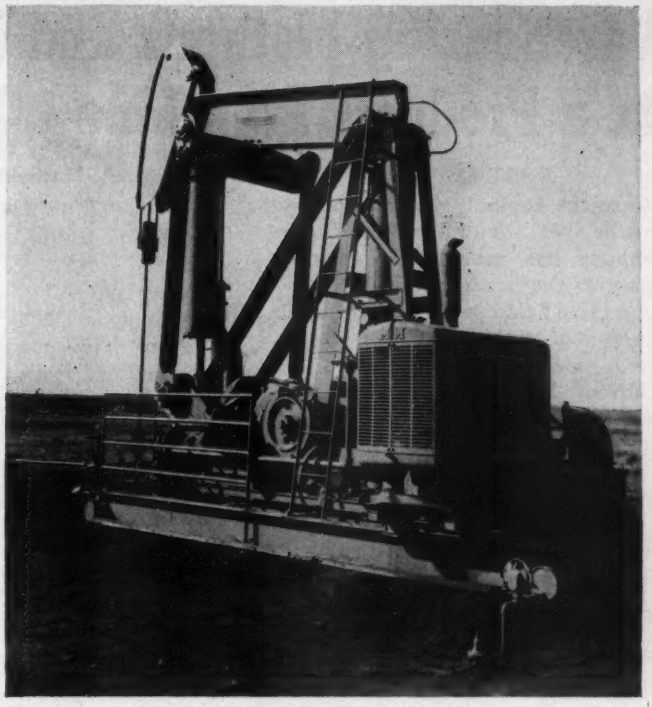
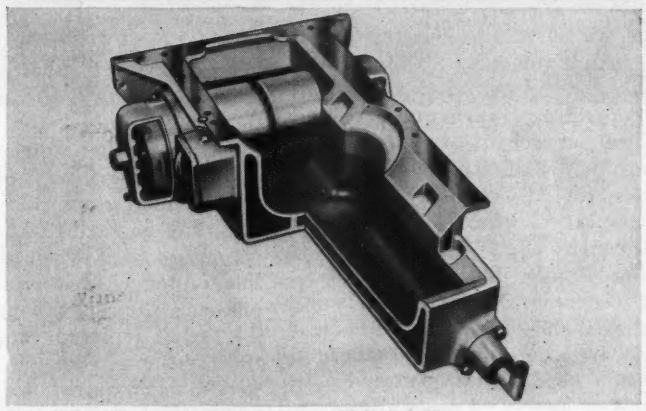
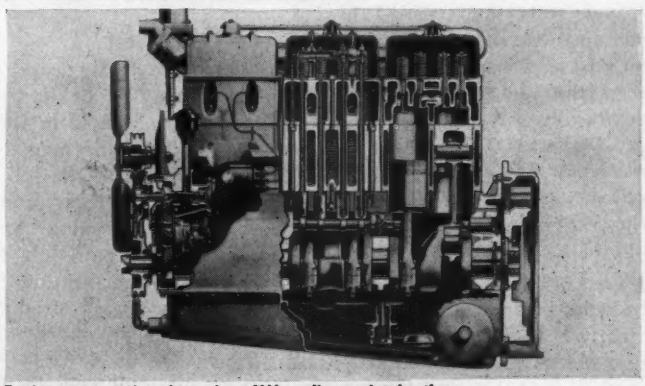




Water-jacketed heat exchanger base pans with large built-in filters provide automatic thermostatic control of lube oil temperature. Oil flow controller maintains constant oil level from reservoir supply. Heavy flange on flywheel end provides 360° rigidity to crankshaft alignment.



Engine cross-section shows how MM cooling maintains the entire engine at a constant temperature. Variation maximum is 4° to 5°. Automatic thermostatic control and by-pass system act as heater or cooler—engine runs at constant temperature under all operating conditions.

Warehousing Methods and Procedures On a Products Pipe Line

ABSTRACT

Since the beginning of its operations in 1941, Plantation Pipe Line Company has maintained warehouses at the headquarters in each of the three field operating divisions. In addition to these division warehouses, each station maintains a minimum but adequate stock of operating supplies and repair parts. Plantation has a standardized material-control and accounting system, and it is the intent of this paper to describe the functions of this system and its related matter.

J. A. Hatfield
Plantation Pipe Line Co.,
Baton Rouge, La.

The operation and maintenance of Plantation's 43 pump stations and delivery terminals, 3 tank farms, and 2,050 miles of trunk lines are apportioned to 3 field divisions. These divisions are operating organizations under the supervision of division superintendents. The division superintendent—through his principal operating, maintenance, and service supervisors—is directly responsible to the vice president-operations for all company activities within his division.

Division offices are located at Baton Rouge, La.; Bremen, Ga.; and Gastonia, N. C. Warehousing facilities and stock, for the most part, are concentrated at these 3 division headquarters; however, an adequate supply of parts and materials is stocked at each station and terminal to supply the demand for a minimum period of 30 days. The value of warehouse stocks at the November 30, 1953, inventory was $963,324, which included $258,404 in line pipe. The total inventory amounted to 1.2 per cent of Plantation's investment in plant, or $390.93 per mile of trunk pipe line. These stocks are maintained almost exclusively for the operation and maintenance of the system.

Repair Parts

In order to protect operations, the company holds to a policy of stocking repair parts for machinery, and pipe and pipe fittings for line repairs. Repair parts are stocked for pumps, motors, meters, valves, switchgear, and other electrical control equipment. All of this equipment is standardized throughout the system. The amount of stock to be maintained in the warehouses has been determined by experience in turnover and time required for delivery from suppliers. Normally, a 60-day supply of stock is maintained. For example, experience has shown that 64 idler gears, 64 shaft bearings, and 16 shafts are used in meter repairs in a 60-day period in the Western Division. Delivery time of these parts from the supplier is approximately 90 days. Therefore, a minimum stock of these parts for a 60-day period would be 64 idler gears, 64 shaft bearings, and 16 shafts. The normal demand for these parts and the time required for delivery of them from the supplier make it feasible to carry a maximum stock of 128 idler gears, 128 shaft bearings, and 32 shafts. Another example would be TK* relays for mainline motor electrical controls. Experience shows an average of one TK relay replaced each month in the Western Division. A 45-day period is required to accomplish factory repairs to these relays. Therefore, a minimum stock of TK relays is 2, and a maximum stock is 3.

Spare Parts

For practical purposes, an adequate supply of spare parts for machinery is held in the custody of the division foremen so that they may proceed to the job without the necessity of their contacting the warehouse for parts. At the completion of a repair job the foreman renders an accounting to the warehouse for parts used, and at the same time turns in to the warehouse the used parts recovered in the course of the job. In addition to this parts' stocking arrangement, the company has available, at strategic points on the system, spare units of essential machinery which can be quickly and efficiently installed whenever emergency replacement of machinery has become necessary.

Warehousing System

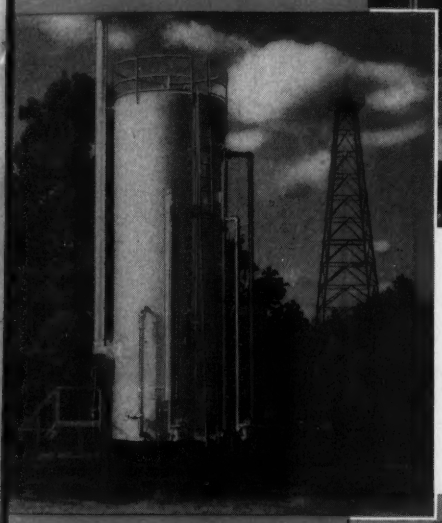
Economy and convenience can be considered the principal reasons for the operating warehouse system. The acquisition of quantities is, of course, advantageous usually from the standpoint of cost. The availability of materials required is essential to the operation of this or any other system. On the other hand, where minor items can be acquired locally, it is generally the policy to purchase in this manner. This not only proves to be more economical, but serves the company well in the furtherance of good public relations. It is the policy of the company to limit local purchases to a total of $25 per month at each station or terminal. Even though there are these limitations to the practice of purchasing materials locally, the company policy is such that, in the event of an emergency or to meet a construction schedule, the materials may be acquired locally in the quantities required. This is merely another application of the overall policy which simply stated is "keeping 'em pumping."

It is well to point out, however, that these local purchases are controlled from the standpoint of uniform quantity and standards. Paint specifications, for example, have been adopted—first, with the idea of acquiring the most suitable and economical product and, second, with the consideration of supply, which is governed by the fact that paints of the brand which meet the company's requirements are available for local purchase at all points on the system.

Other supplies which are not carried in warehouse stock, but which are acquired in quantities not available locally, are purchased and shipped directly to the station or terminal and charged to the proper maintenance or operation. These materials include:

Whatever Your Requirements...

This BS&B installation near Gladewater, Texas, is an example of how large volume treating requirements may be handled. It consists of a BS&B Special Free Water Knockout and a BS&B Special HGT 1028 Horizontal Treater, with a capacity of 30,000 bbls./day. Standard sizes of the HGT will meet capacity requirements ranging from 100 to 4800 bbls./day.



This BS&B Type "J" Vertical Treater installation is typical of many that are handling particularly tough treating problems throughout the oil country. Depending on treater size, the Type "J" will meet capacity requirements of from 100 to 3600 bbls./day. Type "JCW" is similar to the Type "J", except that it has several additional features which fit it for operation in extremely cold climates.

For low cost treating under average conditions, BS&B Type "S" Vertical Treaters like this one perform excellently. It has a capacity range of from 100 to 2500 bbls./day, depending on the size of the treater. The Type "SCW" is structurally the same as the Type "S", except for modifications to adapt it to cold weather operation.

There's a BS&B Emulsion Treater of the Right Size and Type for YOU!

Oilfield requirements for emulsion treaters vary widely from lease to lease and climate to climate. Some situations call for horizontal treaters — some for vertical; some for small capacity — some for large; some for extremely cold weather operation — some for more moderate or very hot climates. Treating problems may be relatively simple — others extremely difficult.

But *no matter what* your treater requirements... BS&B has a treater that will meet them *perfectly*, and which will give years of efficient and trouble-free service. "Down time" for maintenance or repairs will be *considerably less* than for most other makes of treaters.

If you haven't enjoyed the satisfaction of operating a BS&B Emulsion Treater on your lease, we'd suggest you get the facts from your BS&B Man. Or, write for catalogs and information. There's no obligation!

BLACK, SIVALLS & BRYSON, INC.

West Coast Sales and Service Division, Dept. 1-BK12
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EFFICIENCY BS&B RELIABILITY OVER 60 YEARS

Product-filtering supplies
Lubricants
Air filters
Lamps
Sanitary supplies
Wiping rags
Paints
Small tools
Caustic
Scraper parts

The acquisition of materials for storehouse stock, as well as directly for operation and maintenance, begins with the preparation of purchase requisitions in the field. Each requisition lists a complete description of each item or all items, as the case may be — indicating, if possible, the supplier and approximate cost, as well as other facts such as the use for the material, i.e., whether for use on "authority for expenditure" (AFE), station operation, or repairs, and the time needed, and the means of transportation. The requisitions are submitted to the division office, where the warehouseman deletes any materials which are in stock and indicates that these will be shipped from the local warehouse. The requisition is then approved by the division superintendent and forwarded to the purchasing agent in Atlanta. After executive approval, usually by the vice president-operations, the requisition constitutes authority for the purchasing agent to issue a purchase order or orders, as the case may be.

The purchase order presents all essential data concerning the material, manner of shipment, and the date required. Also each purchase order shows the manner in which the material is to be tagged for use at destination. This tagging may indicate storehouse stock, station operation, or other pertinent facts as shown originally on the requisition. Copies of the purchase order are then sent to the accounting and engineering departments, the division office, and the receiving point. When materials are delivered to the destination, and have been checked against the purchase order and found in good order, a "material received report" is prepared, the original and a copy of which are transmitted to the purchasing department; one copy is sent to the division office, and the remaining held for the local file. The purchasing department holds the "material received report" in suspense with the open purchase order until invoiced by the supplier. If the invoice conforms to the purchase order and to the materials, received, the original of both the invoice and the "material received report" is forwarded to the accounting department for processing. The accounting department will then catalogue the invoice with attached "material received report" for payment after all data have been reviewed, comptometered, discounts taken, and sale or use taxes calculated. When date of payment arrives the invoice is vouchered, and a check is drawn and forwarded to the supplier. Thereafter the "material received report" is removed and filed under the local station or storehouse records in the accounting department.

Purchases for warehouse stocks follow this procedure except that, in addition to the tagging "STOREHOUSE STOCK," the assignment of a stock number for each item is required prior to the processing of invoice and "material received report" by the accounting department. A catalogue of materials prepared by the accounting department, with the assistance of the warehousemen, is printed on the tabulating machine in the accounting department, and is made available to each warehouseman and station. Materials in this catalogue are classified roughly as "electrical" and "other materials." Sub-classifications are carried under such headings as parts, line pipe, sanitary supplies, and valves. Each classification is indicated by a control stock number, and each individual item under this control is further identified by an item number. For example, parts for an 8-in. by 10-in. 3-stage pump appear under classification No. 314, and the first stage impeller is identified as the item No. 25. The classification of sanitary supplies is controlled under No. 351, and the items thereunder listed accordingly.

In conformity with Interstate Commerce Commission procedure, the carrier allocates the overhead applicable to the division warehouses to the various accounts as a proration of the cost of materials issued. Included in this poration of material-store expenses are the salaries and expenses of the warehouse personnel. The percentage of this overhead, applied to materials issued, varies according to the turnover of stocks within a given period; however, it averages from 8 to 10 per cent.

The operating warehouses are a functional unit of the division organization, and are under the supervision of the division chief clerk. The warehouse is staffed by a senior warehouse clerk, who is assisted by one or two clerks—depending on the volume of turnover in stocks and on the differences on local transportation problems. The purchasing agent has an assistant and a staff of two clerks and two stenographers. The accounting department has two full-time clerks assigned to the materials section, and these are supplemented by the stenographic forces and the services of the tabulating-machine department. It is the duty of the accounting department to inventory each year the store-house stocks of the entire system.

Under major construction programs, the function of warehousing becomes separate and distinct from that of operations. Personnel are specifically assigned to construction, and temporary warehousing facilities are installed. All records such as requisitions, purchase orders, and material tickets are identified by a special series of numbers, and are filed accordingly.

Requisitions originate with the engineering department, following the design of the proposed facilities. In conjunction with the accounting department, a "tagging" system is devised which indicates, for each item requisitioned, the purpose it is to serve. The description dovetails with the accounting code applicable to individual units and subunits of property.

KEYSTONE SLOTS Undercut 6° or 8° — 30 thousandths of an inch in width and up.

STRAIGHT SLOTS — 30 thousandths of an inch in width and up.

you can be sure of complete sand control with Pacific!

EXTRA FINE GAUGE STRAIGHT SLOTS — 15 to 30 thousandths of an inch in width.

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Branches In: Bakersfield,
Taft, Ventura, and Coalinga

Purchase orders issued in accordance with the authorized requisitions also carry this tagging feature. Copies of the purchase order are distributed to all concerned, including the warehouseman at the job site.

As construction materials are received, the "material received reports" are prepared in the prescribed manner, and the "tagging" is also listed thereon. These material tickets are then matched with invoices from the purchasing department and subsequently transmitted to accounting. The accounting department, in vouchering the invoice, has available the distribution shown on the material tickets. Many suppliers transcribe the tagging from the purchase order to the invoice itself.

Locally, on the job site, a card record is maintained on the materials received. Postings on these cards include the reference to the material ticket and the use of the material in construction. It is presumed, under this system, that the materials will be used according to the tagging. In the event there is a change of plans, this is recorded on a transfer report issued by the warehouseman.

At the close of the job materials remaining are listed on a standard form as surplus, and thereon is included the reference to the material ticket on which each item was originally received on the job site. This listing of surplus is submitted to the operating warehouseman, the purchasing department, and the accounting department. The operating warehouseman will earmark whichever items are carried for warehouse stock. The purchasing department will try to allocate materials to other jobs, to stock, or will attempt to dispose of the surplus otherwise. Material transfers subsequently issued which account for this surplus are then processed by the accounting department, and the project is relieved of these materials.

A standardized material-control and accounting system is used by the three division warehouses. This system is coordinated by the accounting and purchasing departments in the Atlanta office. Final accounting is accomplished, in the accounting department, from information submitted by the field.

Material Control

In the division warehouses there are primarily seven standard records used in material control. Following is a description of each of these records and their function in controlling and accounting for material:

I. **Purchase requisition:** The record is used as the first step in the acquisition of stock items. As mentioned hereinbefore, it is also used for material to be charged directly to a location or job. The requisition specifies the quantity and a detailed description of the material ordered.

II. **Catalogue of material and supplies:** The catalogue of material and supplies is a guide list for all materials in storehouse stock insofar as identifying stock numbers and standardized descriptions are concerned. The materials, including operating supplies, are classified in the following two major groups:

General (including parts)
Electrical

These divisions are arbitrary, but practicable and self-explanatory. Grouped under "general" are all materials, including parts, with the exception of those classified as "electrical." For reference, there is an alphabetical listing of both "general" and "electrical" classifications. All identical materials throughout the system bear the same stock numbers. For example: "Pipe ½-in. galvanized" always appears under stock No. 286-33. All materials and supplies are to be described on material tickets and on other records to conform with the listing in the catalogue. The ready identification of all materials is made possible by the use of the assigned stock number. Material in storehouse stock is to be identified and segregated so that the stock number for each item may be readily known. If an item received for storehouse stock does not appear on the listing, a stock number will be assigned by the accounting department in response to a memorandum or teletype message requesting same.

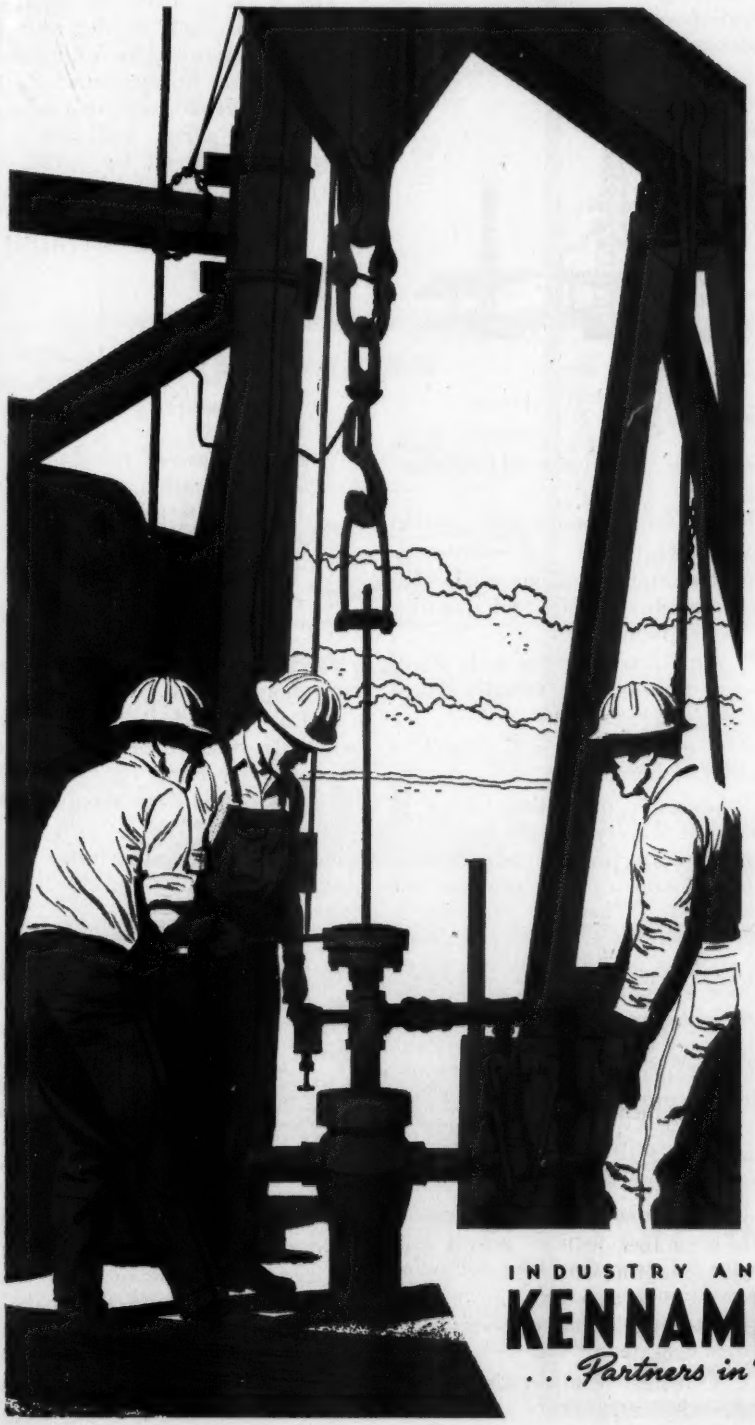
III. **"Material received report"** (MRR): All materials acquired under a purchase order or bought locally for construction projects or storehouse stock are recorded in quadruplicate on this form. However, it should be noted that, when purchases are made of operating supplies such as soap, cleansers, light bulbs, and similar items in small quantities, those expenditures, when included in an individual's monthly expense statement, need be supported only by the receipted sales ticket. In the spaces provided, the following information is inserted on the MRR:

1. Name of person or firm from which material is purchased.
2. Station or storehouse name.
3. Date form is prepared.
4. Local station or storehouse MRR number.
5. Name of "storehouse" receiving goods, "station supplies," "AFE," etc.
6. Means of transportation, i.e., via freight, express, or parcel post, and way-bill number.
7. Transportation amount paid, if collect; otherwise indicate "prepaid."
8. Purchase order number.
9. Description of the material, stock number (if brought into storehouse), grade, and quantity.
11. Signature of station chief, storehouseman, or individual in charge of material.

An MRR is prepared for every shipment of goods purchased, and all goods so received are to be listed thereon. When this form has been properly signed, the original and one copy are forwarded immediately to the purchasing department; one copy to the division office; and one copy retained for local station records. This form is never prepared to acknowledge services performed by some concern such as "cleaning felts" or "repairs to equipment No. 51."

When gasoline, lubricants, and other supplies are acquired and placed in the vehicle, the service-station invoice is sufficient evidence of purchase and receipts, and no material ticket need be issued. The company equipment number is to appear on this invoice. However, if gasoline, oils, and similar items are acquired at the division storehouses, such purchases are recorded on the MRR and brought into stock in the manner prescribed.

Kennametal* goes back down the hole after 448 days ...maximum life of previous valving—20 days



This West Texas producer pumped 168 barrels of oil a day from a well 2370 feet deep. Valve failure caused by sand abrasion of the balls and seats forced him to surface the pump every 14 to 20 days of operation.

After replacing the previous valving with Kennametal Balls and Seats, he got, at last report, 448 days of service before he pulled the pump—and this was for a problem other than valve wear. At that time, the Kennametal Balls and Seats were found to be in satisfactory condition and replaced in the cages. They are still on the job after having served over 22 times as long as previous balls and seats.

Figured in terms of the costs of string pulls, pump repairs and loss of production due to frequent valve failure in problem wells, it doesn't *cost* to use Kennametal, *it pays.*

Kennametal Sintered Carbide, API Balls and Seats are available at repair shops of most major pump manufacturers. Ask your service man to standardize on them. They'll cost you less in the long run.

KENNAMETAL INC., Latrobe, Pa.

* Registered Trademark

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress

Local cash purchases of materials which are to be accounted for on expense statements need not be recorded on an MRR unless the material is acquired for an AFE. Whenever an MRR is prepared under these circumstances, no purchase order number appears on the ticket, and a notation is inserted to read, in effect, that the invoice will be attached to an individual's monthly expense statement. The purchaser retains these invoices and whatever MRR's are required; then he submits all items attached to his monthly expense statement.

Discrepancies between quantities received and those designated on the purchase order or invoice, if any, are to be noted on the MRR. Also full details are shown in case material has reached destination in a damaged condition and the transportation company's representative is to acknowledge this damage on the freight or express bill. Under these conditions the MRR's are forwarded in the usual manner to the purchasing department, accompanied by the transportation bill.

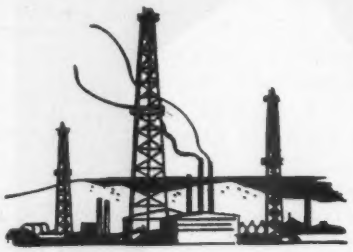
Note: Such material as the following, when received in quantities for local station consumption, is shown to "station supplies" instead of to "store house":

Air filters
Caustic
Flashlights, batteries
Hay (excelsior)
Ice
Light bulbs
Lubricants
Office supplies
Paper towels
Small tools
Soap
Strainer felts
Toilet paper
Towels
Washing powder
Waste and wiping rags

If any of the supplies are acquired for some specific job, information to that effect would appear on the MRR. For example, some of these items might be used in the course of a job, such as:

AFE 2100 "Replacing control lines," or
AFE 2105 "Rearrange terminal lines."

IV. **"Material used report"** (MUR): All materials issued from warehouse stocks to the local station and/or office for construction, operation, or maintenance are recorded on this form in duplicate. The original is forwarded to the purchasing department, and the copy is for the division office. The use of this form is limited to recording issues of materials from storehouse stock under the foregoing conditions. The following information is shown:



1. Storehouse stock.
2. Location of storehouse.
3. Date ticket is prepared.
4. Local storehouse MUR number.
5. Use for material (AFE, station operations).
6. Description of material with stock number, grade, and quantity in catalogue.
7. Date of transaction (this refers to date material was actually issued to the job).
8. Signature of individual in charge of storehouse.

Information pertaining to use of materials is very specific and exact —particularly insofar as the features of construction projects are concerned. Whenever material is issued to replace property in service such as pipe and fittings, a reference is made on the MUR indicating the replacement as well as the material ticket which removes the salvaged materials. Always, when a construction project is concerned, the AFE number appears on the ticket with a description of the specific use of the material.

V. **"Material transferred report"** (MTR): This form is issued as a means of recording the following transactions:

1. Transfers of materials to other storehouses.
2. Transfers of materials to other parties (sales).
3. Bringing into storehouse materials originally charged to operations, maintenance, repairs, and AFE's.
5. Reclassification of materials.
6. Shipments to suppliers and outside shops (an MTR is issued when shipping out, and another if material is returned).

The MTR is made out in quadruplicate on each of the aforedescribed occasions. The original and a copy should be forwarded to the purchasing department, one copy to the division office, and one copy should be retained for local station records. In all instances the following data are filled in:

1. Source from which material is being transferred:
   AFE; or
   Carrier property (state exact feature of property such as motor No. 1, drain lines, section number, pump-station lights); or
   Storehouse; or
   Use in station, section, tank farm, or terminal.
2. Station or storehouse location.
3. The date form is prepared.
4. Local station or storehouse MTR number.
5. Storehouse, individual, or firm receiving material.
6. Date on which material was originally received or installed. (If "material receiving record" cannot be located, this date should be estimated.)
7. Method of transportation (company equipment number, freight, express).
8. Transportation charges paid.
9. Reference to number of receiving record and purchase order on which material was originally acquired.
10. Catalogue description of material, including stock number if storehouse is involved.
11. Signature of person in charge of material.

Three copies of the "receipt of transferred material" are prepared for every shipment to other storehouses, stations, and terminals.

Reclassification of material is prepared on the "material transferred report" for the purpose of revising records both locally and in the At-

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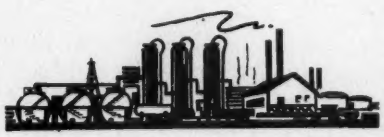

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lanta office, so that all records agree as to the actual condition and type of material. This includes correction to stock numbers, grades, and specifications. For example, if a plug valve received into stock as Fig. 1985 proved later to be Fig. 1989, this form should be issued to make the correction.

VI. **"Receipt of transferred material report" (RTR):** Whenever a "material transferred report" is issued to record the shipment of material to another point on the system, three additional copies of the information are prepared on the "receipt of transferred material." One copy of this receipt accompanies the shipment, and the other two are mailed to the destination. As the material is received at destination, the quantities, specifications, and stock numbers are checked against the "receipt of transferred material," and discrepancies, if any, noted thereon. The receiving station inserts its local RTR number on the three copies, and draws a line through the number already appearing on the ticket as prepared at the point of issue. The three copies are then signed by the station chief; one copy is forwarded to the purchasing department, one to the division office, and one is retained for local files. The receiving station inserts on the ticket full information as to the use or disposal of the material. This procedure records the complete transaction with the typing of only one material ticket, as the receiving storehouse uses the prepared copy of the "receipt of transferred material" as its receiving report.

Whenever materials are sent to suppliers or shops, one copy of this "receipt of transferred material" is transmitted as a bill-of-lading in order to enable outside concerns to check materials and quantities.

VII. **Storehouse ledger cards (post index):** All warehouse stock material is catalogued on post-index rapid reference file, card size 9¼ in. by 8 in., with center fold to make inserted card 5 in. by 8 in. Cards are so constructed that each side is printed in order to utilize front and back for posting. The card carries space headings to list all types of material records under separate columns such as MRR, MUR, RTR, MTR, date space for date of each individual record, and space for remarks pertaining to those records. The remark column is used primarily for showing if outgoing material is used as general operating supply, repairs to carrier equipment, or new installation. For incoming material, this space shows either manufacturer's name or our purchase order number. Current balances are kept on these cards by use of three columns headed "receipts," "issues," and "balances." By daily posting of material records of receipts and disbursements, a current inventory of all materials is shown in balance columns. Heading of cards gives description of material, grade, maximum and minimum amounts to be carried as warehouse stock, and location of material as placed in different sections of our storage facilities. One post-index cabinet is sufficient for approximately 1,000 cards, and is kept as part of current file for filing cards which have been completely posted. These cards, after a normal length of time are removed and filed according to numerical stock-control number in our dead file.

Plantation Pipe Line Company's cataloguing of material is done alphabetically and numerically, with a spare-parts section included for all types of equipment and instruments, the parts are set up alphabetically with separate control numbers for each group. Controller parts would carry control No. 250; individual parts would carry No. 250-1, 250-2, alphabetically. Pump parts for one type of pump would carry control No. 266, and individual parts would be set up alphabetically with No. 1-2-3, same as above. Certain groups of general supplies, all used primarily for one type of work, are included alphabetically under one control number, such as automotive supplies (excluding gas and oil) under stock-control No. 2. Under stock control No. 2 would be listed anti-freeze as possibly No. 2-1; batteries as No. 2-2; tires, with each size being given a separate number, as No. 2-3, 2-4, 2-5. Sanitary supplies are grouped under one control number, viz., No. 351; and all sanitary supplies are set up alphabetically under No. 351-1, 351-2. When post-index cards are correctly in the file, stock control No. 1 is first, and is followed numerically by others. All materials are tagged with their description and stock number in material bins, and bin numbers show on the file card. This gives a cross-reference in case materials, especially small parts, are hard to identify. By having either stock number or description, the material can be located in storage by the number of the bin in which it was placed.

Conclusion

Plantation Pipe Line Company has found that its warehousing facilities are necessary for assured minimum operating interruptions, economy, and convenience. These warehousing operations should not be construed as a chain of hardware stores along the pipe-line route; i.e., necessities are stored, and these are kept to minimum inventories. These warehouses have been a great asset in the successful operation and maintenance of the system.

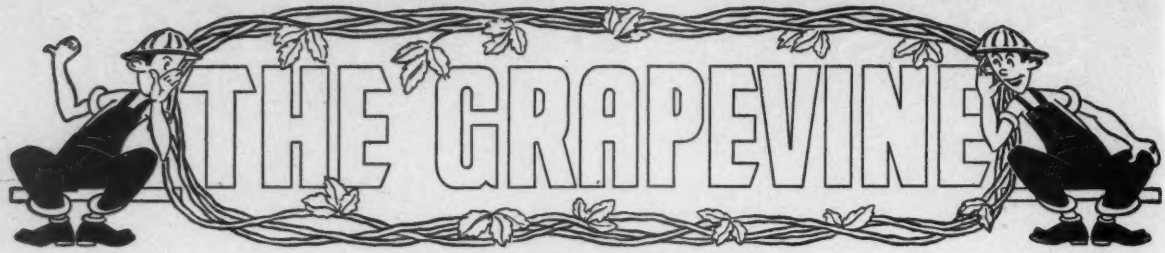
Summary

Plantation Pipe Line Company's system has 43 pump stations and delivery terminals, 3 tank farms, and 2,050 miles of trunk lines. Like many other companies which are spread over a large area, Plantation is divided into three field operating divisions. Division superintendents are directly responsible for all activities in the divisions. At the headquarters of each division, warehousing facilities are maintained as a functional unit of the division organization. Stocks are stored in these division warehouses exclusively for the operation and maintenance of the system. In addition to these division warehouses, each station maintains a minimum but adequate stock of operating supplies and repair parts.

In order to protect operations, the warehouses stock repair parts for such machinery as pumps, motors, meters, valves, switchgear, and other electrical control equipment, and also pipe and pipe fittings for line repairs. Spare units of essential machinery are available at strategic points on the system for emergency replacements. A standardized

(Continued on Page 20)

Season's Greetings
H C Smith
OIL TOOL CO.



By RICHARD SNEDDON

Where it Stops Nobody Knows

The whirl of gaiety that always catches up the oil fraternity at this time of the year and spins it into near insensibility before quieting down is again under way. During the month of December there is simply no rest for the peregrinating petroleum people. The succession of whingdings and whangaroos includes the PPP annual meeting, the Petroleum Club Directors' Holiday Ball, the Wildcat High Jinks, the Youngstown — Emsco party, the bosses' night of the Long Beach Desk & Derrick Club, the Petroleum Accountants' Christmas doings at the Moulin Rouge; Standard of Cal's pre-Wildcat cocktail session, the Purchasing Agents' soiree at the Elk's Club, and so on and so on, **ad infinitum.**

The Spirit is Willing

For those of us who have lost some of our resilience and can no longer rebound with youthful alacrity, this is a strain that exacts a severe toll of our waning energies. However, with the aid of frequent aspirins and an occasional nembutol pill we struggle from one convocation to the other, growing gradually weaker as the festivities continue until at last we sink gratefully into at least temporary oblivion. But come the first week in January we are all back at our desks, worn, remorseful, and well content to settle back to our customary subnormal existence. Anyway, in spite of the inconvenience of the thing, we again wish all our readers a wet and Merry Christmas and a moist and Happy New Year.

Association of Greeters

We have talked on several occasions here about the fine work that is being done in the sphere of international relations by the little export group that, under the banner of the Nomads, has been meeting weekly for quite a few years. This group is rather small but it does an excellent job of providing contact for oil men in foreign service when they visit in the United States, and for other men when they are leaving the homeland for service in foreign fields. Present at a recent meeting of this compact and very much worthwhile organization were John Flanagan, the pleasant mannered and always neatly groomed prexy of the Nomads; Rex Collins, the ebullient young Hydril attache who, we remember, put up an especially good performance during his initiation rites or perhaps it was in the pledgeship period; Harry Hester, the McCullough Tool Company export expert who is a former president of the Southeast Industrial Athletic Association, and a sports fan from away back; and Henry Pullman, the Baker Oil Tools Company ambassador of good tidings, who is known widely and favorably wherever oil men search in other lands for the black golconda.

Also on the Roster

Also in attendance were Bob Gaylord, the tall Wagner-Morehouse chap, one of the industry's top equipment engineers and right nice folk in addition; Chile Sutton, now with Oil Well Manufacturing but a long time operator for Shell Oil Company in Venezuela; Shorty Bowen, the Martin Decker cornhusker, who has spent well over twenty years in Venezuela, Colombia, and Brazil; Tom Ashe, the smart tailored Globe Oil Tools chap who always looks as if he had just stepped out of a band box (must search the dictionary sometime and find out what a band box is, also why so many people step out of them); Joe Schlarb, another of the equipment industry beau brummels, who functions well for Chiksan, and is a pretty nice guy to have around; Ernie Fowks, the longtime Emsconian, one of the founders of Nomads, same of the PPP, and an experienced patents attorney to boot; and By Landis, the ubiquitous Wilson Oil Tool sales chief, a fraternity brother, and a lad with whom we have had an enjoyable acquaintance for quite some years.

Fashion Expert Checks Socks

Then there were Bill Brooks, the B-J wildcat who every time we meet, takes a peek at our socks to see if they match our cravat and quite often finds that the socks don't even match each other; Tom Martin, one of the principal associates of R. J. Eiche & Associates, and another of the equipment industry's most consistent and most generous hosts; Knight Templeton, the modest and unassuming brother of modest and unassuming Dink, Rick, and John, who does a neat export stint for S. R. Bowen; and C. F. Van Loozen, Ideco's ambulating Dutchman, and a right popular person out here on the Pacific slope.

From Far Off Lands

Now that in itself is a pretty substantial assembly of petroleum people and we can assure you that they are a thoroughly consecrated lot. They really work at this business of befriending the visitors from foreign fields and, as we have said before, we have often wondered why the State Department doesn't sense in this nucleus a means of breaking down at ground level some of the international misunderstanding that holds us diplomatically aloof

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- Tubing Safety Joints
- Tubing Strippers
- Tubing Oil Savers
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from certain other nations. Here are a few of the folk from foreign fields who have been hosted by this little group recently: G. J. Van Steveninck, Dutch petroleum engineer, erstwhile of Indonesia, about to transfer to Shell in Venezuela; R. E. Corteau, Gulf Oil Company, Sicily; B. L. Coker, Mosul Petroleum Company, Iraq; Frank de Jarnette, Mene Grande Oil Company, Venezuela; Gus Gure, Drillex, Dhofar, Arabia; M. D. Mier, Empresa Colombiana, Colombia; Shorty Miller, Santa Fe Drilling Company, Peru; Clyde Maupin, Drillex, Brazil; Bill Reis, Iraq Petroleum Company, Bahrein Island; Louis Ramette, Companie Francaise des Petroles, Algeria; Ray Zornes, Iraq Petroleum Company, John Wilkinson, just signed up for a tour of duty in Iraq; Roland Montagu, Companie Francaise des Petroles, Canada; and Harry Huskey, well known Iraq Petroleum Company executive.

The Moody Report

Every year about this time we receive from our good friend, Graham Moody, the Standard of Cal economist up in San Francisco, a reprint of his report on "California Oil," made to the AAPG. This is probably one of the most circulated bits of information that is turned out by any member of the oil industry, and Graham is to be complimented on the thoroughness with which he assembles, correlates, and deduces from, the pertinent data. He tells us this time that there are 33 oilfields in California that will each ultimately make more than 100 million barrels of oil. These 33 fields, which he calls the "big wheels" account for 82% of all crude discovered in the State up to the time of making the report; they provide over 78% of our proved reserves; they are the source of 84% of all crude produced in California from the beginning of time; and they were responsible for 72% of our 1953 production. All of which points to the fact that we need more big wheels. According to Graham, despite the increased hazard and higher cost of present day exploration, the industry "will continue to astonish, perhaps dumbfound, those who forecast its early decline to senility." Well, here's hoping!

TERMINAL PREXY IS BIG GAME FISHERMAN

Emmett H. Jones, president of Terminal Drilling & Production Company, was born in Denver, Colorado, but came to Los Angeles in time to acquire an education at University of Southern California, play some varsity football there, and eventually emerge with a degree in law. He had his initiation into the oil business some 20 years ago and has since had a complete indoctrination—mostly in the drilling and production phases. His firm operates both rotary drilling and well servicing equipment and has two subsidiaries, Terminal Oil Company and Interstate Petroleum Corporation, of which Emmett Jones is also president. These latter extend the total operation into the Rocky Mountain and West Texas areas. Emmett Jones is a member of the Los Angeles Petroleum Club and his favorite diversion is big game fishing. He is reputed to have tried his luck, and usually with a fair measure of success, in every likely patch of ocean from Canada to South America. His drilling equipment, well servicing and remedial rigs, and pulling hoists, are practically all of the most modern design, with full mobility, ease of placement, safe and simple operation, and high economy being the main considerations in the choice of equipment. Other officers of Terminal Drilling & Production Company, all men highly regarded in their fields, are Wm. D. Tetsch, executive vice president; J. N. Gregory, vice president field operations; Roy Edmison, general drilling superintendent; and Boyd Mayfield, general production superintendent.

Ray Miller Dies

We were distressed to learn of the recent death of Ray Miller, widely known executive of the organic chemicals department of the DuPont Company in New York. It had been our privilege to know Ray for some ten or twelve years. We met him first at CNGA gatherings around the early 40's when he was president of the Natural Gas Association of America, and later became more intimately acquainted with him through his close friend and associate, George Tyler. Ray was quietly competent, kindly disposed chap with an inward sincerity that made you feel anytime you had occasion to talk to him that you were a sort of special buddy. It wasn't that there was anything unusual in his approach — he simply had that warm regard for people that made people warm up very easily to him. It is always hard to say something appropriate about a nice chap who passes on and all we can say about Ray is that it was good to have known him and that there are a great many other people in the petroleum industry who over the years have basked pleasantly in the aura of kindness that surrounded him, and are today feeling genuinely saddened by his death. So far as we are concerned, in the last analysis a man is measured by the happiness he has created as he has meandered through life, and Ray in his quiet way built up a pretty substantial balance on the credit side of the ledger.

We Dine With the Bells

The other evening, just as we were preparing to go home after an arduous day on the treadmill, who should wander into our office and invite us to dinner but that irrepressible pair of irrepressibles, Ham Bell and Dorothy, the Bell & Burden people. Being nothing if not Caledonian, we quickly accepted the bid and soon with Virginia Miller and our hosts we were down in the Statler Veranda Room, dining on cracked crab and all sorts of other gastronomical delectables. The **piece de resistance** of this delightsome interlude was a very special concoction, known we believe as a **diable,** the serving of which is about as ritualistic an enterprise as we have attended since we were ex-

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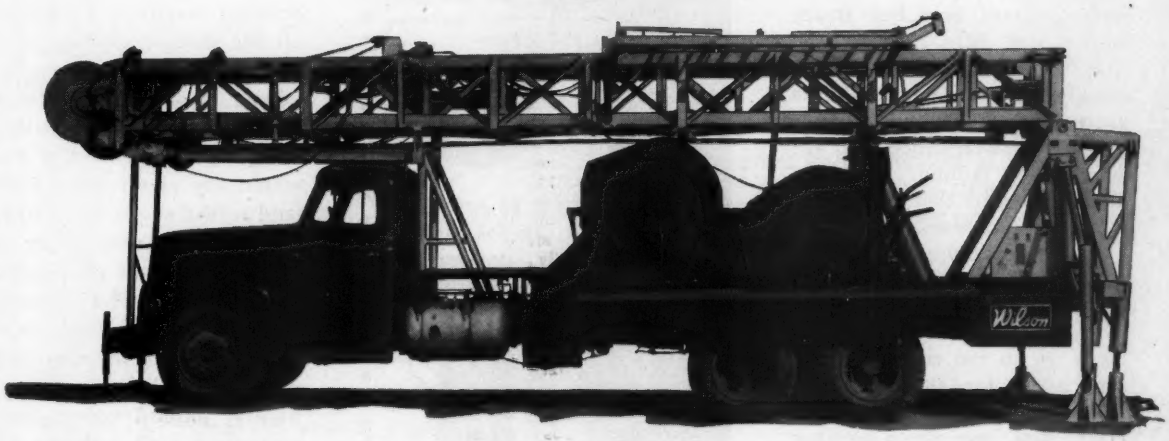

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pelled from the Good Templars over in Glasgow in 1907. Alex, the maitre de of the Veranda Room kindled a fire under a silver bowl, into which he poured a variety of elevating fluids and just the right selection of spices. After stirring this potion vigorously for some time and muttering strange incantations over it, he set the liquid inside the bowl afire too, whereupon Ham yelled lustily, "Fire! Fire!", and the spell was broken.

An Alumni Conventicle

When we had disposed of this lovely libation we returned to the Petroleum Club and were barely inside the front door when who should show up on our starboard bow but Bruce Barkis and Mrs. Barkis, the B & W higher-ups from Houston, Texas, and if you think this chance encounter didn't produce a rash of reminiscence, you are simply not familiar with the facts. It seems that Bruce and Ham were classmates at the California School of Mechanical Arts in San Francisco about the time of the Spanish-American War. Anyway, they admit paying dues to the school alumni association for 48 years. Incidentally, it was recalled that Harry Stolz was also a member of this illustrious institution. They were still slapping each other on the back and ejaculating at frequent intervals, "Well, you old stinging lizard!" when we quietly cast loose and slipped our moorings.

San Francisco Petroleum Club

We hear tell that a new Petroleum Club is in the process of formation in San Francisco. Don't know how far they are along with the deal yet but some very interesting people are involved. Among them are Leroy Hines, the former Standard Oiler, now petroleum consultant with J. Barth & Company; Bill Savage, Standard of Cal's top landman; Jack Sembower, the distinguished looking Shell public relationist; Dan Pickrell, the noted Bay City oil consultant and domino sharpie; Harold Green, the top echelon chap from Reserve Oil & Gas Company; and another noted Chevronite, Bill Greenley. All of which reminds us that we haven't heard a thing recently about the projected Bakersfield and Long Beach Clubs but expect that they are still moving along with their arrangements.

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News from Barcelona

Had an interesting letter the other day from Roy Fly, a lad who had made himself pretty popular around these parts when he was purchasing agent for Western Gulf a few years ago. Roy is now down in the vicinity of Barcelona, Venezuela, with Mene Grande Oil Company, studying purchasing policies, inventory control, and all the diverse aspects of procurement which is distinctly involved in such a remote area. He is quite in love with the Company's San Tome camp which lies about 100 miles inland to the south of Puerta La Cruz, and is a very pretty oasis in the middle of an expensive barren stretch. The off hours of the folk who live there are well provided for in the way of recreational facilities, with a bar, library, billiard room, theater, swimming pool, bowling alley, tennis courts, and a plenty tough nine-hole course. Needless to say, Roy spends most of his spare time on the links but would enjoy the privilege much more, he thinks, if the bets weren't so numerous and complex. He contends that the settlement after the game takes longer than the game itself and sometimes it is impossible to arrive at any definite conclusion as to who has won what that they have to settle the whole thing by the more logical use of liars' dice. Roy expects to be back in Estados Unidos about September next year and hopes that his next assignment will land him in California again. But even if he doesn't roost here permanently, he promises that he will be a visitor whenever circumstances allow.

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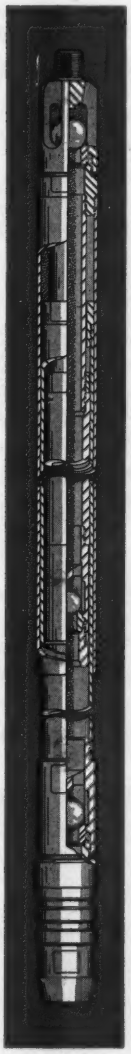

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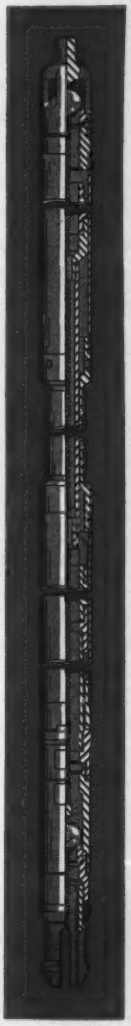

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Warehousing Methods

(Continued from Page 12)

material-control and accounting system is used by the three division warehouses, and this system is coordinated by the accounting and purchasing departments in the main office. Final accounting is accomplished in the main office, from information submitted by the field.

Economy, minimum operating interruptions, and convenience can be considered the principal reasons for the use of the operating warehouse system used by Plantation, and the results have been successful.

*Timing relay.

Presented to the 5th annual spring products pipe-line conference and field trip, under the auspices of the American Petroleum Institute's Division of Transportation, in the Warwick Hotel, Philadelphia, Pa.

The Mass Spectrometer

(Continued from page 2)

carbons are present, an analysis for light olefins is not feasible with the equipment now available.

The M. S. is best used when complimented by fractional distillation apparatus and spectrophotometers.

The Future

Although we claim no distinction as prophets, we would like to pass on to you what the future seems to hold in store for the M. S.

There will be increased analyses of heavier materials. An M. S. is now in production which will analyze these heavy mixtures, in addition to light hydrocarbons. These analyses will be mainly hydrocarbon type analyses. However, mixtures containing a great many components will be resolvable. Materials not commonly handled now by the M. S. will become routine.

In computing, there will be increased usage of electronic digital computers with Spectro-Sadic type converters. In the immediate future, process monitors with integral, analog computors which give percentage directly will become commonplace.

M. S. design will continue to improve. This will result in an improvement in accuracy and less trouble shooting.

Summary

We have described to you some of the typical uses of the M. S. in our refinery. It is a valuable instrument for control, accounting, process evaluation, trouble shooting and air pollution. Needless to say, the refinery feels it is an indispensable tool.

Acknowledgment

We wish to express our appreciation to our accounting and engineering people and especially to Ralph Hoffberg for the assistance given in the preparation of this paper.

Presented before C.N.G.A. Annual Meeting

Ted Jones, owner of Ted Jones Drilling Company is back at his Los Angeles office from another trip to Cuba. Jones, who currently is drilling an exploratory well in the Bacuranao area of Cuba and controls a vast spread of ground there, has made more than a half-dozen air trips to Cuba in the last couple of months.

During their recent trip to Argentina, L. B. Snedden, L. R. Seaman and Bruce Miller of Intex Oil Company of Bakersfield inspected oil fields there and discussed petroleum matters with President Juan Peron.

Manning Barber, former California oil operator, is now engaged in the prospective oil land business in Oregon. He maintains offices in Portland.

Public relation matters of Kalpure Oil Company at San Francisco have been assigned to Dick Skuse, widely known Bay district publicity man.

President Tyler F. Woodward of Southern California Petroleum Corporation of Los Angeles recently returned from an extensive trip by air to Egypt, Japan and other far away places. While in Japan, the popular member of the oil fraternity visited his son, who is with the U.S. Army in Tokyo.

Milton Froning, Shell Oil Company at San Francisco, was chairman of the panel discussion on "Organizing Office Routines" at the dinner meeting the other week of the National Management Association in the Bellevue Hotel in the northern city.

Officers and speaker at the November meeting of the Los Angeles Basin Chapter, A. P. I., are (Left to Right) E. M. Benson, District Supt., Richfield Oil Corp., Retiring Chairman of the L. A. Basin Chapter, A. P. I. Mr. T. Murray Robinson, Oklahoma City, the speaker of the November meeting. Mr. H. H. Carrick, Jr., General Petroleum Corp., The Chairman-elect of the L. A. Basin Chapter, A. P. I.

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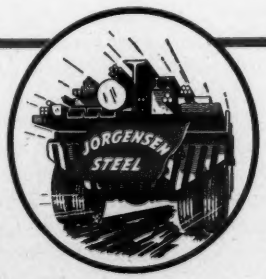

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Rocky Mountain NEWS

Colorado—Idaho—Montana—New Mexico—Utah—Wyoming—Western Canada

General

Construction in 61 days has set a new pipeline construction record with the mid-November completion of the 625-mile Western Pipe Line Co. crude line from Fort Laramie, Wyo., to Freeman, Mo. The line was constructed by a newly organized subsidiary of Service Pipe Line Co. to replace Service's existing facilities east of Fort Laramie. The new line will give Rocky Mountain oil, particularly that in the Denver Julesburg Basin, an additional 178,000 barrels of daily pipeline outlet. The Denver Julesburg Basin will also be served by the recently completed Arapahoe line which is capable of moving 80,000 barrels daily from north eastern Colorado. The Western line connects with Service's existing Wyoming system at Fort Laramie. The Rocky Mountains, with the completions of these last two pipeline projects now has ample pipeline capacity, lack of which has been an historic obstacle to exploration and and production in this region.

Canada

Public hearings now being conducted by the Alberta Petroleum and Natural Gas Conservation Board on the Alberta Gas Trunk Line Ltd.'s application to build a 340-mile gathering system should provide some answers as to the well-head price of natural gas which can be paid when the Trans-Canada pipeline goes into operation. N. E. Tanner, Trans-Canada president, has declared that early approval of the gathering line would allow Trans-Canada to set the well-price of the Alberta natural gas, which will be moved over the longest pipeline in the world to supply the populated centers of eastern Canada. Trans-Canada has tentatively offered 14 cents per thousand for Alberta natural gas delivered at the Saskatchewan border. The well-head price will then be determined by the gatherings costs of the Alberta Gas Trunk Line system. Producers have balked somewhat at the less than 14 cents price for their gas, maintaining that it would not cover exploration expenses, deep drilling costs and producing over-head. Trans-Canada's president has asked producers to "recognize the rigid economics which dictate the beginning of our operation." He expressed the hope that producers "will co-operate with us." Trans-Canada officials maintain that purchasing costs higher than 14 cents in Alberta would price the natural gas out of a market in eastern Canada.

Pictured above are the newly elected officers of the Rocky Mountain Oil and Gas Association. (Left to right): William H. Curry, Casper, Wyo., vice president for Wyoming; Gordon Kirby, Billings, Montana, vice president for Montana; Harold H. Healey, Casper, Wyo., president; Fred E. Woodring, Casper Wyo., executive vice president; and T. H. Hammett, Denver, Colo., vice president for Colorado and Nebraska. Photo by Bill Schott, Denver.

Canada's largest crude oil system was placed in operation recently in ceremonies at Edmonton when Alberta Premier E. C. Manning placed the order via phone which put the pumps on the 72-mile 16-inch Pembina Pipeline in operation. The line will move crude from the rapidly developing field at Pembina southwest of Edmonton to that city where connections with the Trans-Mountain pipeline to the west and the Inter-Provincial line to the east will be made. Mannix Ltd. contractor, completed the line in record time despite adverse weather, muskeg and other obstacles. Construction began last July. The line is designed to move 115,000 barrels of crude daily which could be increased to 150,000 barrels daily with the addition of a booster station. When fully installed next year the gathering system will cover 375 square miles, embrace 325 miles of pipe and serve 3500 wells.

Reviewing the short but dynamic history of the Canadian oil industry and forecasting its general outline for the future, Ole Berg, Jr., president of the British-American Oil Producing Co. told an American audience recently that the prospects of oil and gas in western Canada were the brightest of any industry in Canada, despite a recent levelling in prairie

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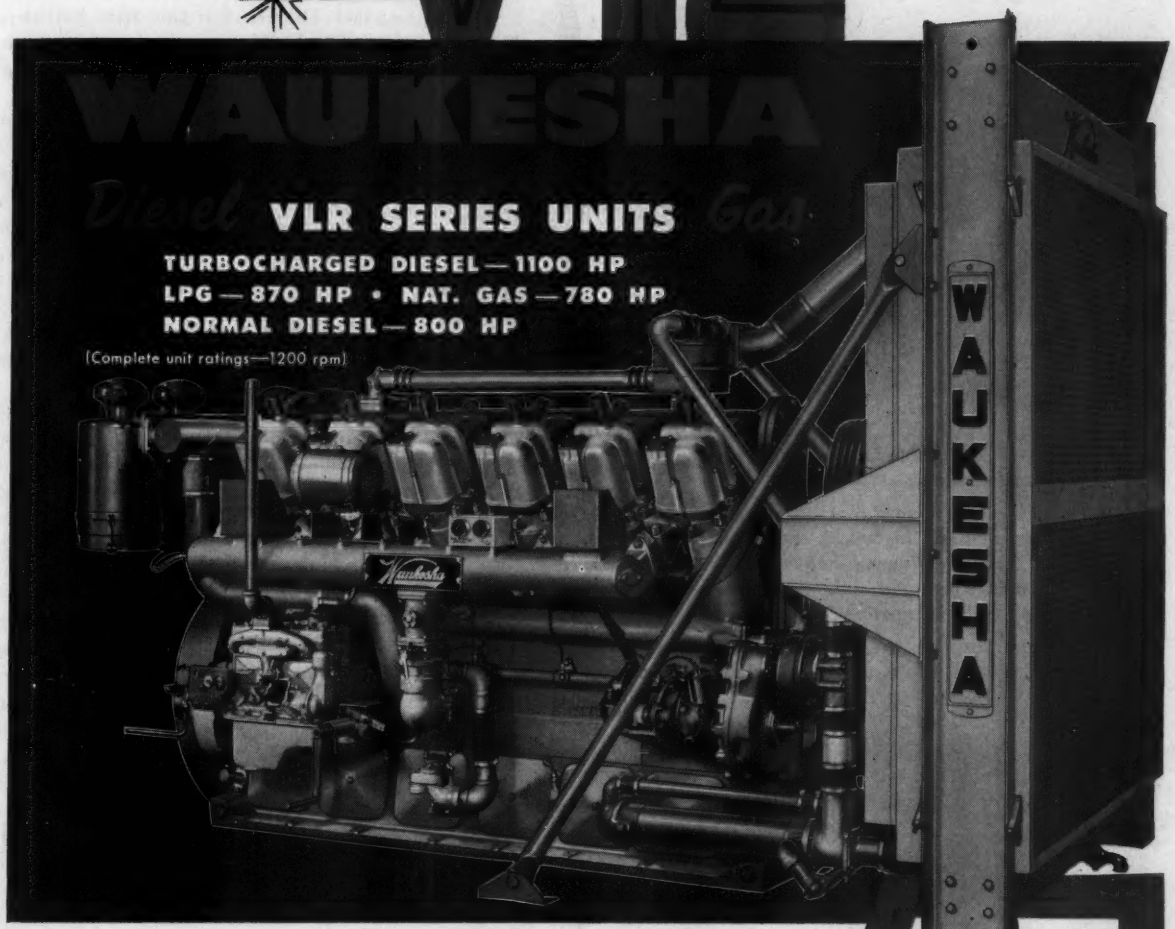

● This powerful new Waukesha is a twelve-cylinder, high compression, overhead valve, 60-degree vee, four-cycle engine of 8½-inch bore and stroke, and 5788 cubic inch displacement. Connecting rods are side by side type; opposing pistons operating from a single wide-area crankpin. Bare engine ratings at 1200 rpm are: Turbocharged Diesel, 1135 hp; Normal Diesel, 830 hp; Butane-Propane, 900 hp; Natural Gas, 810 hp. Response to throttle and load requirements is quick and smooth, with a fast surge of reserve power for emergency and overload demands. Tremendous in power, remarkably rugged, the V-12 is designed for simplicity and reliability. Major parts are interchangeable between right and left cylinder banks. Main and rod bearings are easily accessible. Strength, precision and balance are built into all elements of the power train, from pistons to flywheel. Supporting members are designed for extreme rigidity and perfect alignment of moving parts. Send for Bulletin 1656.

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province crude production. Since World War II the industry has expanded so rapidly that it is now furnishing 45 to 50 per cent of Canada's domestic consumption. Western Crude producers are now in a period of adjustment steadying down for a long range payout of the billions which have been poured into the industry development in Western Canada, Mr. Berg stated. The economic benefits which will flow from this investment of $7 billion will propel western Canada into new phases of economic expansion which could rival the industrialized eastern provinces, Mr. Berg predicted.

Capital realized by the Anglo-Iranian Oil Co. in the recent settlement of the Iranian oil nationalization may find an outlet in Canadian development. At least that is the forecast in Canadian financial quarters. Through a subsidiary Anglo-Iranian has already bought into one Canadian oil company. The company has announced that its name is being changed to British Petroleum Co.

While other measurements of oil industry activity declined in the first three quarters of 1954 from the standards set in the same period of 1953, crude production and income rose in Alberta. Oil income in the principal oil province rose from $135,000,000 for the first nine months of 1953 to $166,000,000 for the comparable period of 1954. The income represents a production of nearly 66,000,000 barrels compared to 56,300,000 barrels for the like period of 1953. Drilling permits, footage drilled and wells completed were all down from the 1953 figures.

A new acreage figure for Manitoba has been set by Canadian Gulf Oil Co. in bidding $312.50 per acre for two and one half sections in the Virden-Roselea field. The previous high bid for Manitoba acreage was $94 entered this year for acreage in this same field.

First major outlet for medium gravity crude of Saskatchewan's Fosterton field is one project closer to realization with completion of the Fosterton-Regina South Saskatchewan pipeline. The 153-mile, 16-inch line is undergoing tests and crude oil will begin arriving in Regina by mid-January. When the Minnesota pipeline is completed this coming June, the Fosterton crude will move via the South Saskatchewan, Interprovincial and Minnesota line to the new 25,000 barrel per day refinery now under construction by Great Northern Oil Co. near the Twin Cities. When in operation the new system will be capable of moving 20,000 barrels daily to the new refinery which will be ready to go on stream about the time the Minnesota pipe line is completed. The Fosterton crude has only low demand in Saskatchewan as its 21 to 24 degree gravity does not yield the high proportion of gasoline needed to supply the agricultural needs of the province.

North Dakota

The long discussed project of North Dakota Natural Gas Transmission Co. to move natural gas from Tioga to Fargo, Grand Forks and other eastern North Dakota cities is once again before the North Dakota Public Service Commission. In recent hearings the commission was told by various experts that the proved reserves of gas in the Madison limestone have risen from 297 to 400 billion cubic feet in seven months; that the gas supply contracted by North Dakota

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Here is another example of how Procon is serving the petroleum refining industry with its planned process construction . . . process construction that is planned so that every requirement will be successfully and economically fulfilled.

Procon's job at the Ingram plant was to install modern refining units, along with the necessary auxiliary facilities. The project was started by dismantling existing equipment. Then a 10,000 B/SD crude topping unit, a 4,000 B/SD UOP Fluid Catalytic Cracker, gas concentration, polymerization, and vacuum units were installed.

In addition to the process units, a considerable amount of offsite construction was completed by Procon, including buildings, steam generation, water supply and disposal systems, loading racks, and dock lines.

The same careful planning that resulted in Ingram's new and modern refinery is available to everyone when they choose Procon. And no matter what the scope of the project may be, construction by Procon means a job well-planned . . . and well-completed.

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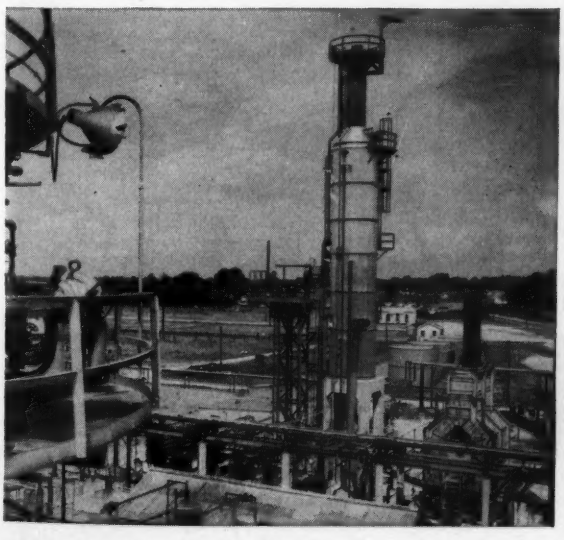

The vacuum unit tower rises in the background. To the right of the tower can be seen the vacuum heater, and in the foreground, the "cat" cracker.

The UOP Fluid Catalytic Cracking unit as seen from a portion of the large tank farm at the new and modern refinery of Ingram Oil and Refining Co.

Natural Gas Transmission Co. now included all Nesson Anticline fields as far south as Charlson in McKenzie County. If approved the project would cost an estimated $11,017,200 to construct the 274-mile system. An application by Northern Natural Gas Co. of Omaha is now pending but has been indefinitely postponed at the company's request.

Montana

Monoco Oil Co. has staked two additional locations in the East Baker area of Fallon County after an initial pump and flow gauge of 495 barrels a day was reported for their No. 1 Ferguson-Goldin. The production is from the Red River interval 9246-9284 feet with the announced possibility that the trap is stratigraphic. If so it would be the first such in the central portion of the Williston Basin, The discovery is seven miles east of Baker and the Cedar Creek Anticline. McAlester Fuel Co. is drilling a southeast off-set.

In Rosebud County's Northwest Sumatra McAlester Fuel has established the possibility of a new pay in that flourishing field. At their No. 2 NP the Amsden dolomite has produced 1850 feet of 29.7 gravity oil on a one hour drill stem test. The established producing formation in the field is the Health sand in which McAlester subsequently cored 33½ feet of saturation of No. 2 NP. Continental Oil Co. drilling No. 16-A Kinchloe three quarters of a mile east has also recovered oil in the Amsden section but it is 10 degrees lower than that in the McAlester test. Continental is drilling ahead to test the Heath.

In Brorson area of Richland County Sun Oil Co. and Phillips Petroleum Co. are staking No. 1 Dennis Dynneson as an Ordovician test. It is a mile northwest of the No. 1 Dynneson the Ordovician discovery and one-half mile west of the No. 2 Dynneson, a Madison limestone completion.

Powder River County reports credit George J. Greer, Trustee with a shut in gas discovery at No. 1 Allen, Pumpkin Creek area. The operator, however, has not confirmed or denied the widely circulated reports that the test flowed gas at a rate of 2,000,000 cubic feet gas per day from the Eagle. There have been few significant shows in this Montana portion of the Powder River basin.

Wyoming

Eleven wildcats tests are pacing an increase of tempo in Wyoming oil exploration following a breathing space of several weeks duration. Principal focus of activity is the east side of the Powder River basin where two very important and a total of five tests have been recently staked.

A Pennsylvanian test staked well out into the basin from the eastern edge by Rochelle Oil Co. at No. 1 Govt., Campbell County, will undoubtedly command major interest. It will test the Minnelusa, a Pennsylvanian age sandstone roughly equivalent to the Tensleep sand, a very stable Wyoming producing horizon, at an anticipated total depth of 10,700 feet. A success here would confirm the feelings long expressed in Wyoming on the deep possibilities of this great depositional basin, the second in size in the Rocky Mountain region. The test is staked almost astride the Weston-Campbell County line about 20 miles west of the Cretaceous age Newcastle sand production in the Clareton area of Weston

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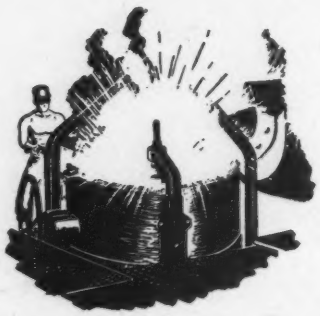

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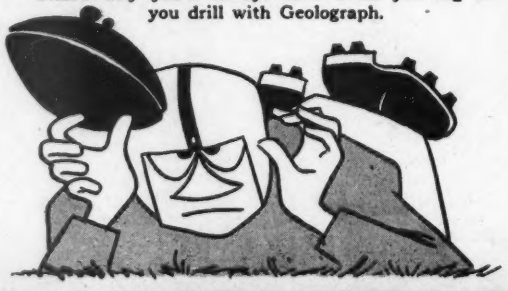

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County. The acreage was farmed out by Gulf Oil Corp.

Between the new Minnelusa test and the concentrated Newcastle sandstone production in southwestern Weston County True and Brown—R. H. Fulton have staked No. 1 Darlington three miles north and slightly east of their Rochelle area discovery where No. 1-E Govt. Western Empire flowed 800 barrels per day on completion last April.

Another closely watched wildcat test will be Far West Oil Co.'s No. 1 Govt., Morton, South Poison Spider, Natrona County. The objective and anticipated depth have not been announced at this test, the first in this area of central Natrona since the Forest Oil Corp.'s Grieve unit discovery, 15 miles southwest, fostered a positive re-evaluation of central Natrona County. Forest Oil Corp. has now completed two wells on the unit, each flowing in excess of 1000 barrels per day. A third test, a wildcat, is still drilling as is the third offset to the discovery.

Application of the Cheyenne Valley Pipe Line Co. for a certificate of public necessity and convenience for construction of a crude oil pipeline from the Cheyenne River area of Weston County to a connection with the Platte Pipeline at Fort Laramie, Wyoming, has been withdrawn by the principals H. O. English, Casper, Wyo., and Maurice Yates, Salt Lake City. The Wyoming Public Service Commission has cancelled the hearings. The application was withdrawn without prejudice.

Colorado

Sinclair Oil and Gas Co. is running pipe at No. 1 Bradbury, the first apparent discovery in Elbert County. The seeming success, where oil was recovered in the J sand, is 30 miles southwest of production at Little Beaver and Badger Creek fields and in line with the south and west drift which Denver Julesburg Basin exploration has taken in the past years. Total depth is 7333 feet with the top of the J sand at 7165 feet. There has been little exploration in Elbert County but leasing has been active with a number of operators controlling substantial blocks which could prompt a sharp increase in drilling.

Another apparent Denver Julesburg Basin success has been registered at Kimbark Co. and Sterling Drilling Co.'s No. 1 Porter, nine miles east of production at Badger Creek, Washington County, where the J sand drill stem tested 4600 feet of gas and 1200 feet of oil. Total depth is 5150 feet.

Utah

Carter Oil Co. has tested a second zone of commercial possibilities at No. 2 Bluebell Unit, Duchesne County where 2340 feet of 19 gravity oil was recovered from the interval 9470-9505 feet. A previous test recovered 2790 feet of 25 gravity oil in the Green River interval 9009-9105 feet. An intervening zone tested salt water. Top of the Green River is 7055 feet.

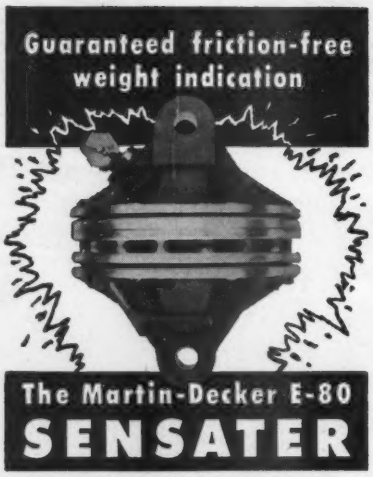
In southeastern Utah Shell Oil Co. is testing No. 2 Desert Creek Unit, reporting a flow of 256 barrels of fluid per day cut eight per cent. The flow, from three separate zones in the Pennsylvanian age Paradox formation, is the first commercial production in the area, although there have been substantial Paradox shows in other tests. Before being shut-in for storage the well tested a flow 1150 barrels of oil per day.

Los Angeles Chapter ASM Monthly Meeting, Nov. 1954

"Principles in the Use of Alloys at high Temperatures" was the subject of the talk given by Professor J. W. Freeman, Research Engineer, Engineering Research Institute, University of Michigan at the regular monthly meeting of the American Society For Metals.

Professor Freeman illustrated the type of complete design data needed to make an accurate evaluation of a material. These data would include such information as the combinations of time, temperature, and stress which would produce known deformations and fractures. He mentioned that the cost and elapsed time required for such a series of tests are so great that they are seldom completed for any one material. Professor Freeman then discussed a number of methods for safely extrapolating incomplete data.

He mentioned that such factors as melting practice, heat treatment, and microstructure played a large part on high temperature strength. He showed data indicating an overlap in the strength scatterbands for carbon steels and austenitic stainless steels at temperatures as high as 1100°F.



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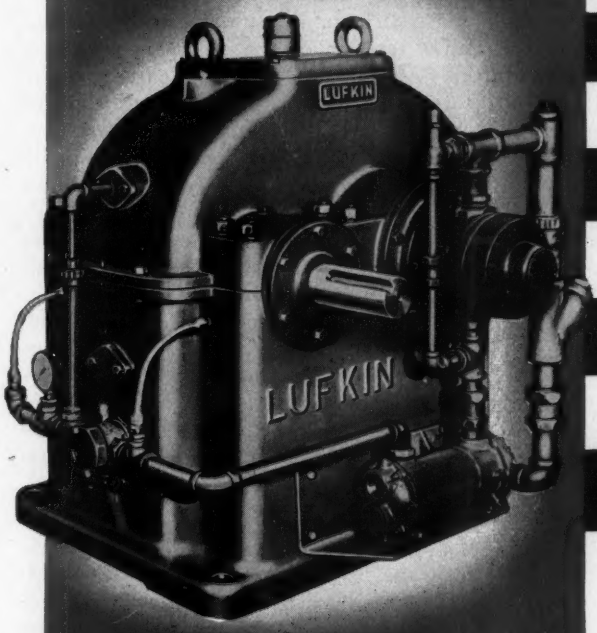

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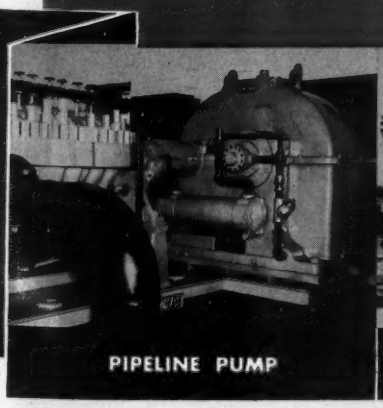
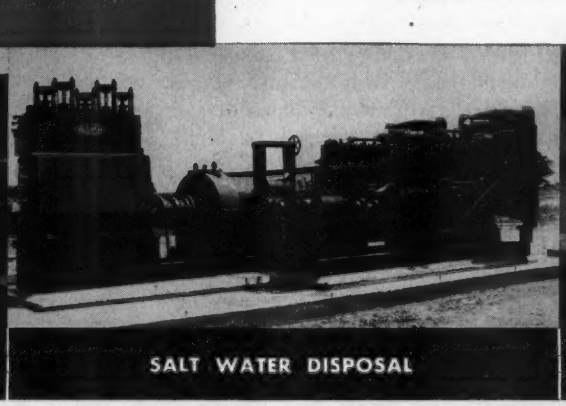


PIPELINE PUMP



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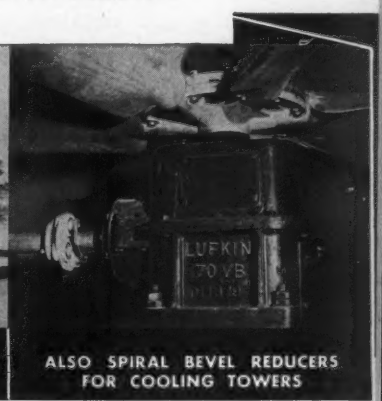

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Personalities IN THE NEWS

Heath Advances At Kaiser Steel

Charles M. Heath has been appointed assistant manager of industrial relations for Kaiser Steel Corporation, it was announced recently by G. E. Balsley, manager of industrial relations.

Charles M. Heath

With Kaiser Steel since 1950, Heath had been resident attorney for the company at the steel plant in Fontana and more recently served as assistant to the manager of industrial relations. He will retain offices in Fontana and will assist in the direction and supervision of all industrial relations functions at the steel plant and at the company's iron ore and coal mines.

Before coming to Kaiser Steel, Heath was engaged in private law practice in Pasadena for four years and from 1942-46 was a special agent for the Federal Bureau of Investigation in Washington and other eastern cities.

A native of Grants Pass, Oregon, he received his early education at The Dalles, Oregon, and was graduated from Stanford University in 1938 with an A.B. degree. He received his law degree from the University of Southern California in 1941.

Heath is a member of the California State and San Bernardino County Bar Associations, a member of the Zeta Psi and Phi Delta Phi fraternities, president of the newly formed Civitan Club in Glendora and president of the Fontana Water Company. He resides at 750 E. Dalton, Glendora, with his wife, Marian, and their three children, David, 10, Martha, eight, and Gregory, who is six.

Refinery Promotions Made At T. W. A.

Five members of the staff of Tide Water Associated Oil Company's Avon refinery have been promoted, it was announced recently by William P. Hugo, manufacturing manager of the Company's western division.

Benjamin C. Shaul, former process superintendent, has been named the new superintendent of engineering, maintenance, and construction in charge of all engineering, drafting, inspection, stores, salvage, maintenance and construction at the Avon refinery.

B. G. Jones of Concord has been appointed superintendent of distillation and cracking, supervising light crude distillation, the fluid catalytic cracking plant, the No. 4 gas plant, the thermal cracking plants and the hydrobon platformer now under construction. Formerly Jones was superintendent of the thermal cracking plant.

The superintendent of Avon treating and lubricating oil manufacturing facilities will be Charles L. Persyn of Associated, formerly superintendent of the fluid catalytic cracking. He will be responsible for all alkylation, isomerization, light oil and solvent treating, and the lubricating oil manufacturing facilities.

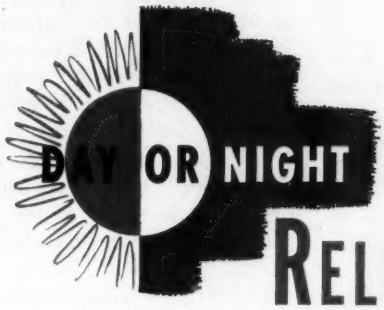
H. L. Benson, formerly superintendent of the Company's natural gasoline plants at Ventura, Calif., has been named superintendent of shipping and utilities with responsibility for packaging and shipping operations, major transfer facilities including Tide Water Associated's Avon and nearby Amorco and Port Costa terminals, together with all utilities at the manufacturing plant.

Louis Mittelman of Associated, chief chemist in charge of the control laboratories at the Avon refinery, assumes the additional responsibility of coordinating the activities of the technology department there.

M. Anthony (Tony) Mattes, Standard Oil Company of California advertising manager and San Francisco Advertising Club president, has been named a member of the board of directors for the Association of National Advertisers and representing the West Coast.

Appointment of J. Howard White as Shell Oil Company financial vice president at San Francisco has been announced. White has served as vice president and controller since 1949. A. A. Buzzi succeeded White as controller.

Los Angeles oil man Samuel B. Mosher has been elected to the board of trustees of Occidental College. Mosher is president of Signal Oil and Gas Company. He also is a director of the American Independent Oil Company, American President Lines, American Petroleum Institute and Western Oil and Gas Association.



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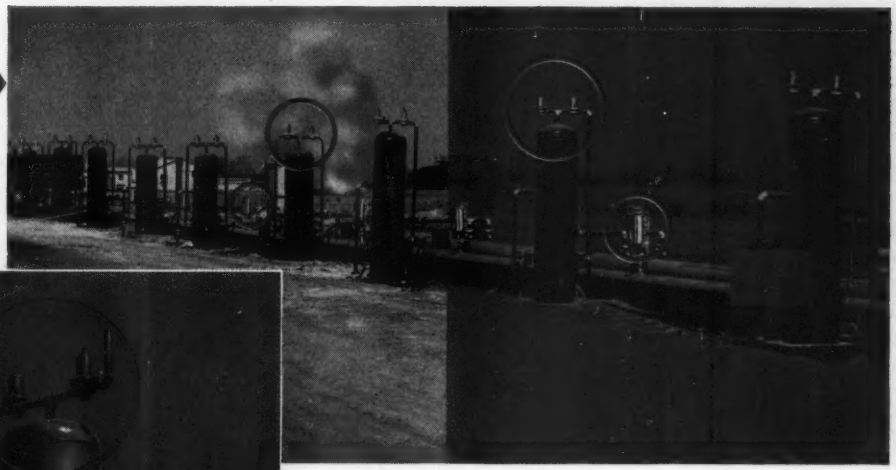
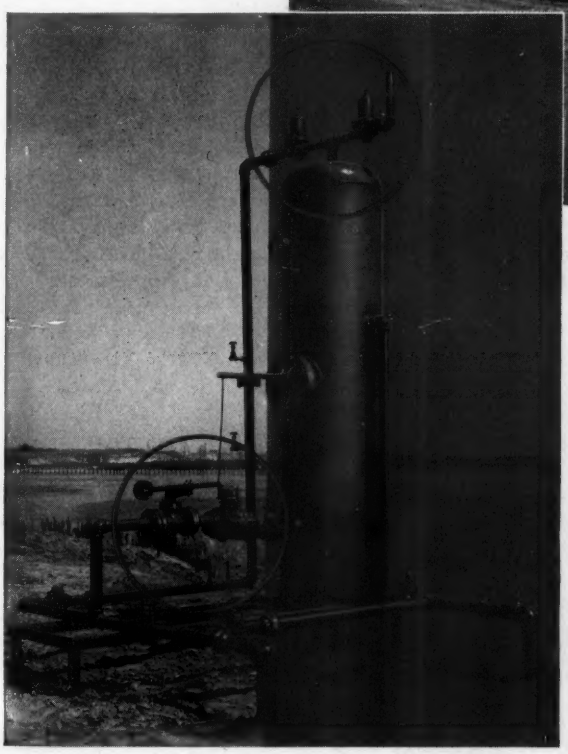
Reliance Back Pressure and Relief Valves working in conjunction with Reliance Liquid Level Valve (LV10) on separator.





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RELIANCE REGULATOR DIVISION
ALHAMBRA, CALIFORNIA

Baroid Honors Employees

National Lead Company recently honored its oldest employees of the oldest drilling mud service company —Baroid Division.

Mr. George L. Ratcliffe, vice president of National Lead Company and founder of the drilling mud industry, presented a gold watch to Mrs. Barbara Cook and Harold H. Farnham on behalf of the National Lead Company in recognition of their twenty-five years of service.

Mrs. Cook, manager of the order and shipping department, began her career in 1929 as a secretary. In 1933 she was made office manager and served in that position until 1948 when she was appointed to her present office.

Mr. Farnham, manager of technical sales and operations at the Baroid Division, began his company career in 1929 as a chemical engineer in Los Angeles. In 1933 he was appointed manager of the Gulf Coast Division. From 1946 he served as assistant to the manager in both the Los Angeles and Houston areas until his appointment to his present position in 1953.

Philip H. Patchin Passes Away

Philip H. Patchin, retired Vice-President and Director of Standard Oil Company of California, and widely-known former newspaperman, died on Nov. 30th after a prolonged illness.

Death came at his home in San Mateo, to which he had recently returned after residing in Santa Monica for several years.

The Standard executive, whose distinguished career included several intervals as a top State Department Aide, retired from the Company in 1943 after 24 years of service.

Mr. Patchin, 70, was a native of Des Moines, Iowa, and was educated in public schools of that community. He began his newspaper work in 1902 as a reporter for the Des Moines Register Leader.

In subsequent years, Mr. Patchin was a correspondent in Brazil and Cuba for the New York Sun, served in China with the China Press, and covered assignments in Mexico and England for the New York Herald Tribune.

He was a front-line correspondent for the Herald Tribune during some of the World War I fighting in France.

Mr. Patchin's State Department assignments included Chief of the Division of Foreign Intelligence, Chief of the Division of Information in World War I, and Executive Secretary of the American Peace Commission under President Wilson and Secretary of State Lansing.

In 1921, on leave from Standard, he returned to government service briefly as Secretary of the Disarmament Conference and Assistant to Secretary of State Hughes.

Mr. Patchin joined the Company in 1919 as Assistant Secretary, later was named assistant to the President with responsibility for Public Relations. He was elected a Director of Standard in 1935 and Vice-President in 1942.

In the 1920's he was instrumental in the Company's support to early aviation activities. Under his direction, Standard painted rooftop guide signs on its installations throughout the Coast and installed high-powered aviation beacons at seven prominent points, one of them Mt. Diablo.

Mr. Patchin also developed the Company's two prize-winning radio programs, the Standard Hour and the Standard School Broadcast. Active in community affairs as well, he was a member of the Board of Management of the Golden Gate International Exposition from 1937 to 1939.

Surviving are Mr. Patchin's widow, Mary, of the San Mateo address; and two daughters, Mrs. Alfred Whittell, Jr., of Los Angeles, and Mrs. Thomas G. Greene, of Rome, Italy. Mrs. Whittell and Mrs. Greene were present. He is also survived by a brother, Robert H., retired Vice-President of the Grace Lines, New York City.

Mr. Patchin was a member of the Pacific Union Club, the Burlingame Country Club, the National Press Club and the Metropolitan Club of Washington, D. C.

Gold watches are presented to 25-year Baroid employees by George L. Ratcliffe, vice president of National Lead Company and founder of Baroid, center. Harold H. Farnham, left, and Mrs. Barbara Cook, right, accepted the awards in recognition of their long service with the firm.

Lawrence E. Bourquin, General Petroleum Corporation district manager at San Mateo, was the principal speaker at the recent meeting of the Society for Advancement of Management in San Francisco.

After two years with the Navy, H. Dean Simmons has returned to his post in the home office engineering department of Signal Oil Company at Los Angeles.

Personal service—western style

HERE is what Kaiser Steel means to line pipe users in terms of personal service.

It means that you can get immediate, on-the-spot service from our full staff of trained metallurgists, technical men, production men, and sales personnel.

This personal attention to your needs—plus *uniform quality, on-time delivery* and *wide range of sizes*—is another reason why Kaiser Steel can best meet the needs of the area it serves.

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Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

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Field Development

Shell Stakes Nevada Location

Maintaining its exploration and development program in Nevada, Shell Oil Company has staked location for its Eagle Springs No. 35-35 on Section 35-9n-57e in Nye County. The drill site is some 1500 feet south of the company's discovery well currently producing 250 barrels of oil a day from the interval of 6730 feet. In the Railroad Valley area, Bandini Petroleum Corporation's exploratory hole has been given up at 5552 feet. Located seven miles north of the original Shell find, the Bandini venture was credited with slight gas showings near 4300 feet. Nevada surface exploration is presently at a record high, with a half-hundred geologists located in the state and a dozen or more geophysical crews active.

Union Winds Up Peru Work

Union Oil Company announces completion without success of its exploratory venture in the Sechura Desert in Peru. Seven wells were drilled under the program and only minor, non-commercial shows of oil and gas were encountered.

In Costa Rica, the company's first test, Patino No. 1 was spudded late in November and currently is drilling at 3500 feet. It is projected to a depth approximating 7000 feet.

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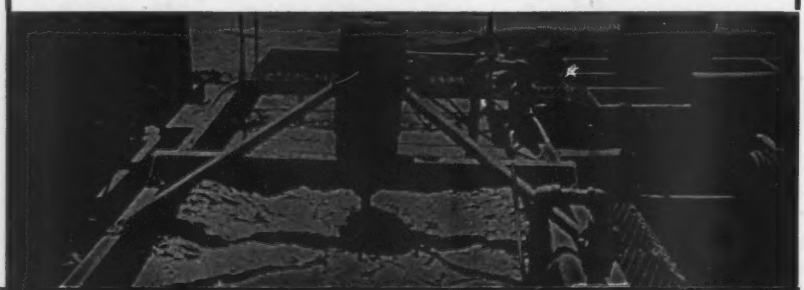
Exceptionally low filter loss under all drilling conditions.

Proper easily controlled gel strength and good suspension.



BROWN MUD COMPANY

MAGCOBAR DEALER

DIXON RIO VISTA 4-0813 | VENTURA Miller 3-8168 | LOS ANGELES WEbster 3-5618 | BAKERSFIELD FAirview 2-6410

Belgian Anticline Rewards Ohio Oil Co.

Ohio Oil Company has completed another excellent well in the Belgian Anticline field. F. E. Smith Government No. 4 on Section 23-30s-21e came in from 5828 feet with a whopping 1252 barrels net of 34.8 gravity oil and 835,000 cubic feet of gas a day. In use was a 28/64-inch hole. Casey & Montgomery did the drilling.

Sharktooth Test Planned

Any day now Fred A. and Caroline C. McMaster are expected to start the drill in their Christina No. 1 wildcat on Section 25-28s-28e, southeast of Sharktooth in Kern County. The target is the Vedder zone.

Round Mountain Wildcat Barren

Nothing commercial came of drilling to a total depth of 3478 feet and as a result G. R. Nance & Associates has quit Intex-Glide No. 1 wildcat on Section 5-28s-28e in th vicinity of Round Mountain.

Slater Wildcat Location Staked

One of Standard Oil's next wildcat wells to get started in Kern County will be C.W.O.D. No. 87 on Section 22-27s-26e in the Slater area. On the Shamrock Anticline, Standard's No. 52-33Z keeps digging way below 1200 feet. It is on Section 33-30s-22e. In the Sunset Flank district, the company's No. 63-3K is nearing 1000 feet.

AVAILABLE JOHNSTON by AL CAPP
STOP!!-AN' WHISPER TH' WORDS AH IS DYIN' T' HEAR!!
YO' MEAN THEM THRILLIN' WORDS 'BOUT HOW WE JOHNSTONS DO TH' FINEST TESTIN' JOB, BECUZ O' TH' HYDRAULIC TESTER, THAT PREVENTS SHOCK T' FOR-MAY-SHUN, PIPE, AN' INSTRUMENTS!!
NO!!-THOSE EVEN MORE THRILLIN' WORDS, 'BOUT--
'BOUT HOW TH' HYDRAULIC TESTER GIVES YO' POSITIVE OPER-AYSHUN EV'RY TIME?-
PSST!!--AH THINKS SHE MEANS--
OH!!-NATCHERLY!!-
MERRY CHRISMUS T' YO'!!
-AN' YO'!!
-AN' YO'!!
Cal Capp

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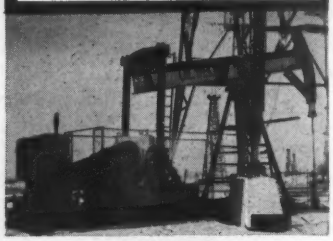
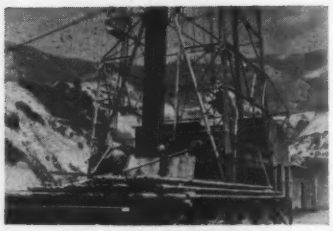
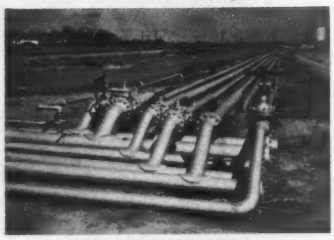
EQUIPMENT and SUPPLIES for



DRILLING



PRODUCTION



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"THE HOUSE THAT SERVICE BUILT"

Tejon Ranch New Pool Discovered

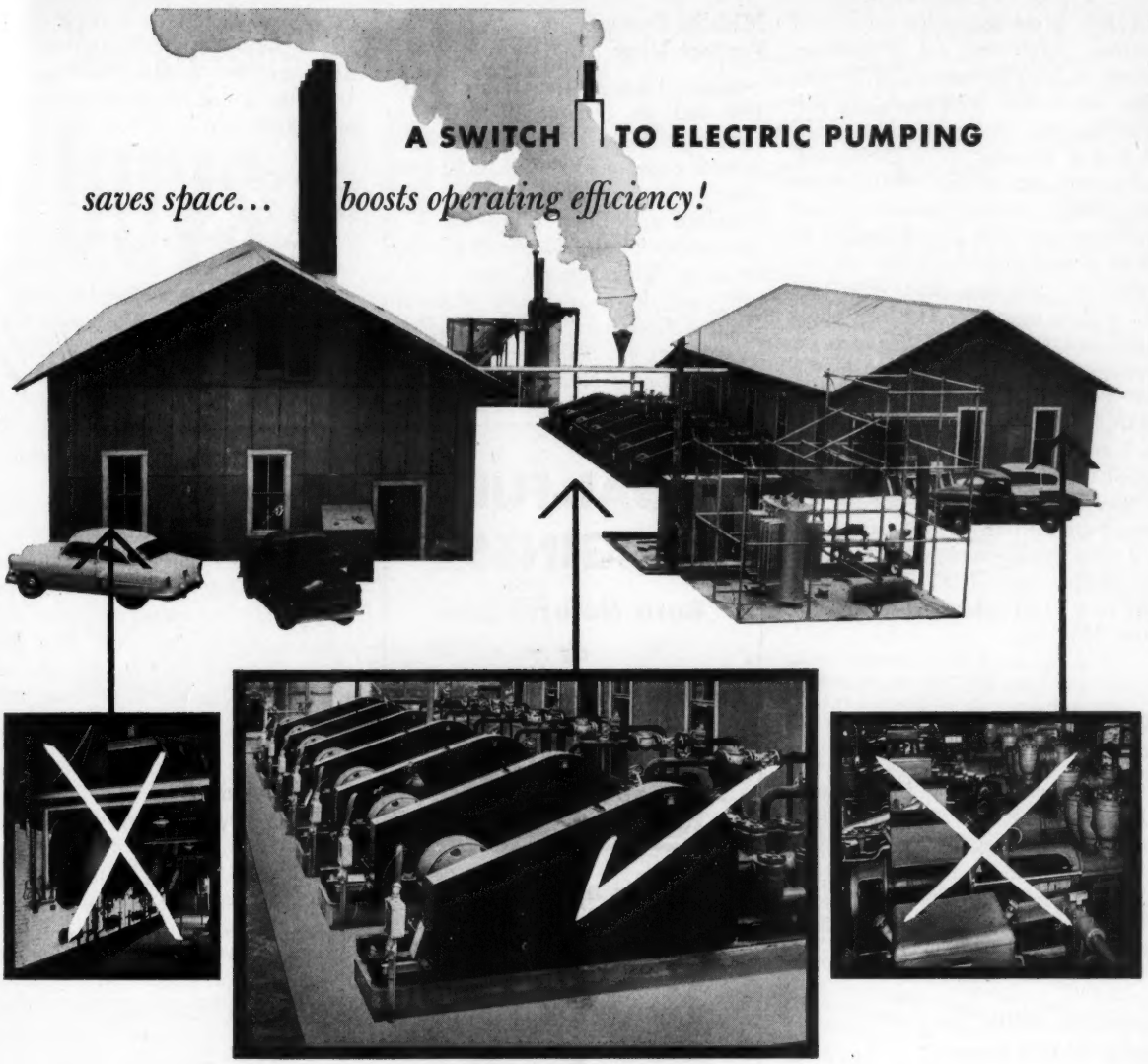
It is a rare month on the Tejon Ranch in Kern County when drilling operations do not account for opening something new and lucrative in the way of oil production. The latest event in that rapidly expanding operation is Drilling & Production Company's success in opening new oil from the Jewett oil sand zone with its J. V. No. 33-33 on Section 33-11n-19w. Drilled to a bottom of 7066 feet, the Jewett was found about 1000 to 1200 feet below the average depth of Olcese production, about a mile eastward. The fresh find is on ground held by Drilling & Production, Reserve Oil & Gas Company and Edwin W. Pauley. It was designed as an extension test and it lies on the northwest border of the central sector of the area. Engineering was handled by Green & Kirkpatrick. On test J. V. No. 33-33 made more than 1000 barrels of clean 37 gravity oil a day through a one-eighth-inch bean. The Olcese at this location evidently was gray and barren. Lake Oil Company, which lately extended Tejon Ranch Olcese production a quarter-mile southwest with its Crane No. 1, is drilling Crane No. 2 on Section 34-11n-19w below 2500 feet. The No. 1 was finaled at 5867 feet for an initial output of 600 barrels of 29 gravity oil a day. One and one-half miles from the Tejon Hills field, Richfield Oil Corporation is preparing to put down its Tejon D. No. 81-8 wildcat on Section 8-11n-18w. Location is a short distance northeast of Standard's Tejon Ranch No. 4-65, which was abandoned some years ago at 2600 feet.

Midway-Sunset Wins New Laurels

There is no sweeter music to an operator than that melody of oil flowing to tanks in volume. And to keep the symphony going, Exeter Oil Company is well under way with another project on its lively Murphy Fee property in the Midway-Sunset area. Known as Murphy Fee No. 13-J, well at last reports was not many hundred feet above objective depth around 5400 feet. The company's second well to the new deep

A SWITCH TO ELECTRIC PUMPING

saves space... boosts operating efficiency!



Standard Oil Company of California recently replaced steam-driven pumps at its Huntington Beach pumping station with seven electric motor-driven units. And one of the benefits—space-saving—is illustrated graphically by the photographs here. The new compact electric units, located outdoors, do the job previously done by the boilers and pumps housed in the two buildings.

Several other benefits are present in the new installation, but not shown in the pictures: Economy, reliability and efficiency. Handling more than 50,000 barrels of oil per day, the electric pumps maintain a plant operating efficiency of 75%.

Standard Oil's new electric booster pumps permit automatic pushbutton control from dispatching station 12 miles away. Dispatcher knows number of barrels per hour pumped and level in storage tanks at all times.

Edison

SOUTHERN CALIFORNIA EDISON COMPANY

zone was lately completed at a total depth of 5401 feet for a primary output of 1650 barrels of 32 gravity clean oil a day with a 32/64-inch orifice in use. A recent check indicated that by way of a 24/64-inch choke yield was at the rate of 1140 barrels daily. Exeter opened the pool last September with a well brought to life at a total depth of 5360 feet for a yield of little less than 1700 barrels a day initially. The new producer and the well drilling are on Section 28-32s-24e. Land held by The Texas Company and Standard Oil of California just about surrounds the Exeter 50-acre property. Texaco tapped the pool the other month with its No. 56 on Section 32-32s-24e for present production of 844 barrels of 31.9 gravity oil and 420,000 cubic feet of gas daily from a bottom of 5452 feet. The Exeter sand was picked up at 5347 feet.

Rosedale Test Drilling Ahead

On Section 13-29s-26e in the Rosedale area, C. K. M. Oil Company's Rosedale Station KCL No. 1 wildcat is drilling ahead at 3500 feet toward objective depth of some 5000 feet. Contractor is McNee Oil Drilling Company.

Guijarral Hills Field Well Flows

Union Oil Company has completed its No. 36-26 well on its valuable Spieler lease in the Guijarral Hills field for a current yield of 385 barrels of 39.8 gravity oil and 169,000 cubic feet of gas a day from a total depth of 9020 feet. Flow is restricted by a 24/64-inch bean. The Leda sand was topped at 8874 feet. Thomas P. Pike Drilling Company as contractor put the well down on Section 26-20s-16e, Fresno County. On Section 1-21s-16e, Union Oil's Los Nietos Company is drilling near 9000 feet with its Bourdieu No. 55-1 wildcat in the Guijarral Hills area. Location is southeast of the field and aim of the test is around 10,000 feet. In the Turk Anticline area, Artnell Oil & Gas Company, Inc., is making hole below 8000 feet with Cantua Lands No. 72-22 on Section 22-17s-15e.

Middle Dome Project Digs

Middle Dome Corporation's No. 38-19V test on Section 19-23s-19e at Kettleman Hills Middle Dome keeps drilling close to 6500 feet. The company represents interests of both Standard and Bolsa Chica Oil Corporation, with the former the actual operator. This Kings County test is being put down by Rocky Mountain Drilling Company, contractor. Present yield of Franco Western Oil Corporation's new Norris-Drilexco Baylis No. 62-29 test on Section 29-24s-18e in the Pyramid Hills is 10 barrels of 35 gravity oil a day on the pump from the Point of Rocks interval of 3072-3088 feet.

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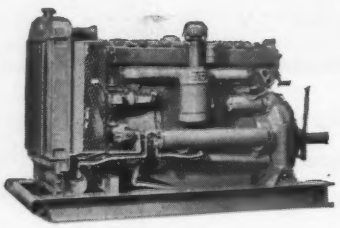

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Kern County Deep Test Set

All set to drill a 15,000-foot wildcat test somewhat less than a dozen miles southwest of Bakersfield is Shell Oil Company's Posuncula No. 1 on Section 1-30s-25e, Kern County. Shell has under lease approximately 2100 acres in the area taken from Kern County Land Company. The property is no great distance from the Strand and Canal fields.

In Fresno County, Shell's Shell-Merchant Kreyenhagen No. 86-8 on Section 8-22s-16e continues to drill steadily ahead well below 5000 feet. Interest in the play on some 2700 acres is shared by Shell with Merchants Petroleum Company. The drill site is a little less than four miles southeast of the Jacalitos field.

Pond Wildcat On the Way Down

Intex Oil Company has spudded-in and at last reports was drilling in the shallower formations with its Fabri-Carstens No. 13 wildcat venture on Section 23-25s-24e in the Pond area.

Incidentally, Intex, which maintains head office in Bakersfield, has announced the removal of its Coastal District geological and land branch to 131 south Chestnut street in Ventura.

Wheeler Ridge Test Interesting

Ready to start the drill is Richfield Oil Corporation's KCL G No. 87-22 test on Section 22-11n-20w and northeast of the Wheeler Ridge field. The project, on a lease of approximately 4200 acres, is three-fourths of a mile from the field and one and one-half mlies from the closest Eocene production. The company already has clicked with one well tapping the Eocene on the lease. One and one-half miles southwest of Eocene production, Richfield is redrilling below 9000 feet with its San Emidio No. B-2 on Section 31-11n-20w. The venture the first time down was carried to 11,938 feet.

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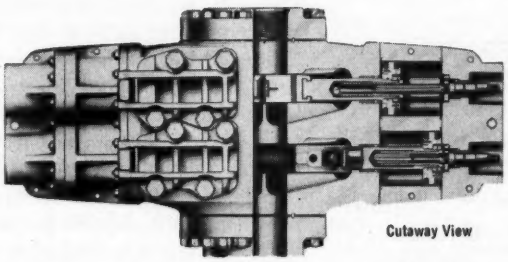
When you specify SHAFFER!



Cutaway View

Cellar Control Gates are an important investment—one you don't make every day. So before you buy *any* cellar control gate equipment, compare—get *all* the facts on the important advancements you get *only* in SHAFFER Hydraulic Gates!

...in Safety!

In Shaffer Gates you get field-proven safety backed by the organization that pioneered cellar control gates well over a quarter-century ago. The dependability of Shaffer equipment is unsurpassed!

...in Compactness!

In Shaffer Hydraulic Gates you don't have to allow *extra* space above or at the ends in order to change rams. Shaffer's exclusive side-opening doors open across the *minimum* dimension of the gate—where there's adequate room. Simply unbolt and open the doors ...change rams...and bolt the doors shut again. Closing the doors automatically aligns the rams within the gate. Even in sizes as large as 13⅝" (12" Series 900), Shaffer Gates are only 30" in total height. *No extra space need be allowed for servicing the rams!*

...in Accessibility!

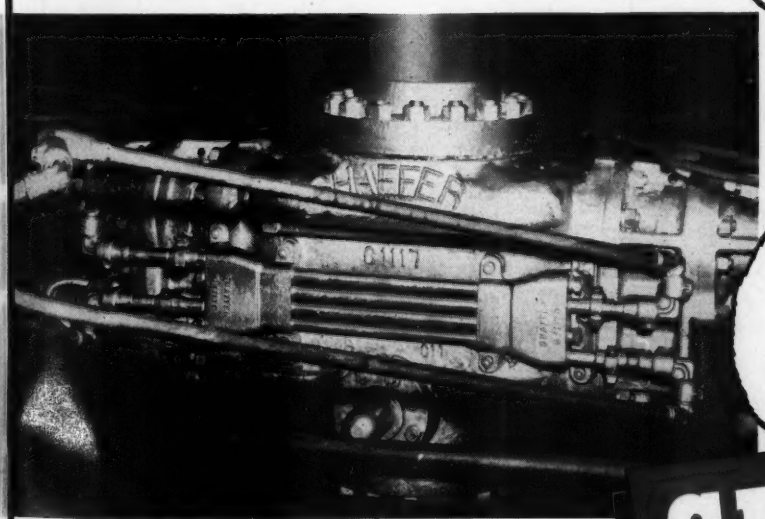
With Shaffer Hydraulic Double Gates, rams in either compartment are changed with *equal* simplicity. There's no need to dismantle the upper unit to change rams in the lower unit. Each is completely independent of the other—each has its own convenient side-opening doors

...in Selection!

Shaffer alone provides a choice of Double and Single Hydraulic Gates—whichever best meets your needs. Rams and most other parts are interchangeable size for size, assuring the best solution to your particular requirements—*at lowest inventory and maintenance costs.*

What's More...

Only Shaffer offers a complete line of both Hydraulic and Mechanical Control Gates to meet individual preferences. Another cost-saving advantage—ram blocks and ram rubbers are interchangeable in the same sizes of Hydraulic and Mechanical Gates, simplifying inventories where both types are used in field operations.



Installation view showing simple hydraulic manifolding for operating the gate.

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Kingsburg Test Awaits Big Rig

Agoil Company is understood awaitting heavier rig to take down from present depth of 2485 feet its Agoil No. 2 wildcat on Section 28-16s-23e, east of Kingsburg in Tulare County. In the West Plano area, Freudenthal-Dowling & Holts' Standard-Campbell No. 1 test has been given up at 988 feet. Basement was topped at 981 feet.

Mount Poso Well Finaled

A yield of 10 barrels of 16.3 gravity oil daily, cutting heavily, appears as the present production rate of the Bradford Bishop, Operator, Vedder No. 1, a newly completed well on Section 20-27s-28e near Mount Poso. The well is bottomed at 2187 feet.

Cuyama Wildcat Oil Search Ends

Drilled to 9295 feet and disappointing all the way, Richfield Oil's F. K. Perkins No. 66-28 wildcat venture on Section 28-10n-26w has been relegated to history. Southeast of the Russell Ranch field, the company is approaching spudding-in stage with its Russell No. A61-9 test on Section 9-10n-27w.

West Edison Test Flowing

Kalpure Oil Company of San Francisco has placed on production its Des Moines No. 1 wildcat on Section 16-30s-29e at West Edison. On test it flowed at the rate of 576 barrels of 20 gravity oil daily by way of a 16/64-inch bean. Total bottom is 5376 feet, with plug at 4681 feet. Locations for two additional wells have been staked.

Panorama Hills Wildcat Drilling

At Panorama Hills in San Luis Obispo County, California Valley Oil Company's interesting Jansen No. 51-S-28 test on Section 28-31s-21e was was last reported making hole under the 1500-foot level. In the Caliente Trough area, Shell Oil Company is about to pick up drilling where it left off at 7602 feet the other week with its Lewis No. 56-30 wildcat on Section 30-29s-18e. Heavier equipment was rigged to go deeper. Shell's Smith One No. 61-8 on Section 8-30s-19e in the same general area is digging beyond 4000 feet.

Playa Del Rey Wildcat Staked

Edwin W. Pauley and Donald Frankel will shortly embark upon drilling of their Huges No. 1 wildcat project on Section 22-2s-15w on land east of Playa Del Rey in Los Angeles County. Location is some 150 feet north of Kidson No. 1-1, which was originally drilled by Bolsa Chica Oil Corporation, but later taken over by Frankel as operator early last year. The Kidson well was taken to a total depth of 7474 feet, subsequently plugged at 6916 feet and then redrilled to 7423 feet. It was recompleted in April of 1953 for 59 barrels a day. Some weeks thereafter, the well was producing 45 barrels of 26 gravity oil, cutting 50 per cent.

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Whittier Well Good

Colorado Oil Company paid a return visit to its old abandoned No. 19 in the Whittier area and has completed the well for 60 barrels of clean oil a day. Given up in August of 1939 at 5436 feet, the new operations were exemplified by cleaning out and redrilling southeasterly to 2577 feet.

Mint Canyon Test Suspended

At a depth of 1650 feet, plus or minus, Webb Oil Company's Alma No. 1 wildcat on Section 8-5n-14w at Mint Canyon in Los Angeles County has been suspended for a time at least.

Orange County Dusters Recorded

Recent abandonments in Orange County, included Erin Oil Company's Freedman-North La Habra No. 1 on Section 5-3s-10w in La Habra wildcat territory, and Union Oil Company's Naranjal No. 5-7 test on Section 7-3s-9w at Brea-Olinda. The latter came to a halt at 5311 feet.

Corona Test Drills Ahead

Near Corona in Riverside County, North Star Mining & Development Company's North Star-Temescal No. 1 exploratory well is digging around 600 feet. Still idle at 4725 feet is Al Godfrey Drilling Company's Botiller No. 1 test on Section 29-3s-7w at Prado Dam.

Over in San Bernardino County, Ord Oil Company is drilling well below 2000 feet with its Ord No. 1 explorer on Section 9-4n-3w in the Hesperia area. Adelanto Development Corporation's project on Section 7-8n-5w at Adelanto was last reported down 2600 feet. Northwest of San Bernardino townsite, E. H. Brawner's Laurabel No. 1 on Section 25-1n-6w is inactive at 995 feet.

Pelona Valley Wildcat Idle

Difficulty in shutting off water appears to have brought about temporary cessation of operation with James R. Saul's Germaine No. 1 wildcat in Pelona Valley, Section 19-5n-13w, Los Angeles County. It is bottomed at 1590 feet.

Santa Fe Springs Project Drilling

Southern California Petroleum Corporation and St. Anthony Oil Corporation's Smith-Mizner No. 1 test, southeast of the Santa Fe Springfield, is drilling under 1200 feet. The drill site is on Section 4-3s-11w and about 1450 feet east of where Mills and Anaheim-Telegraph road cross one another. A portion of the 220-acre lease block is understood to have been acquired from Union Oil Company, holder of offset land and financial contributor to the drilling of the test. Ultimate bottom will follow a pretermined directional drilling pattern in reaching the objective Meyer zone.

Whittier Narrows Wildcat Moves Ahead

With Ben Owens as contractor, Western Gulf Oil Company's Raney No. 1 wildcat project on Section 8-2s-11w in the Whittier Narrows area is drilling ahead at an intermediate depth. The derrick stands in the vicinity of Workman-Mill road and Walnut street. In the Sansinena area, Union Oil Company is ready to begin its Sansinena No. 12-G-1 test on Section 31-2s-10w.

Bandini Test Flowing Oil

Completed flowing at the rate of 227 barrels of 39 gravity oil a day through a 10/64-inch orifice, Atlantic Oil Company has given the concluding touch to its Jarvis No. 1 test on Section 17-2s-12w in the Bandini sector at East Los Angeles. Location is near the intersection of Washington boulevard and O'Neil avenue.

Beverly Well Moving Ahead

Universal Consolidated Oil's fourth well on the Twentieth Century-Fox studio property in Beverly Hills is drilling not a great distance above 5000 feet. The company's No. 3 well was completed some week's ago from a shallow zone around 5300 feet or about 1700 feet uphole from point of termination of the first two projects. Initial yield of No. 3 was 80 barrels of oil and 1,000,000 cubic feet of gas daily. Sun Drilling Company is contract driller for Universal.

Long Beach Focal Point of Interest

Of more than ordinary interest is the surprising successes scored in recent months on the northeast flank of the Long Beach structure. Both Hancock Oil Company and The Texas Company have several wells working toward completion. Texaco gets credit for opening the airport sector and

Standard Oil of California's Todd 301 being put down at Oxnard by Dunlap & Graham. Left to right: Frank Burress, cathead; J. L. Smart, derrick; Clyde Lighter, driller; Hugh Gordon, racker; Les Rojas, pusher.

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since has chalked up a number of excellent producers. Hancock's 1st well there was finaled for more than 3000 barrels a day. Land being drilled is more or less controlled by faulting and is generally believed to be somewhat limited in extent. General Petroleum and Union Oil share interest in the Hancock play. The producing zone in the airport sector apparently correlates with the Long Beach deep zone.

Sunset Beach Test Drilling

At Sunset Beach in Orange County, where testing in late months has uncovered new oil, Hedges-Smith-Erlich's Phelps No. 1 wildcat on Section 2-5s-11w is digging around 2000 feet. On the same section, Atlantic Oil Company's Lomita No. 1 keeps going ahead below 7000 feet.

In the county's Placentia area, The Texas Company is expected to set in motion shortly its Prentiss No. 1 test on Section 32-3s-9w. At West Newport, the R. B. Watkins Operations' Huntington Beach No. 2 test on Section 13-6s-11w has started.

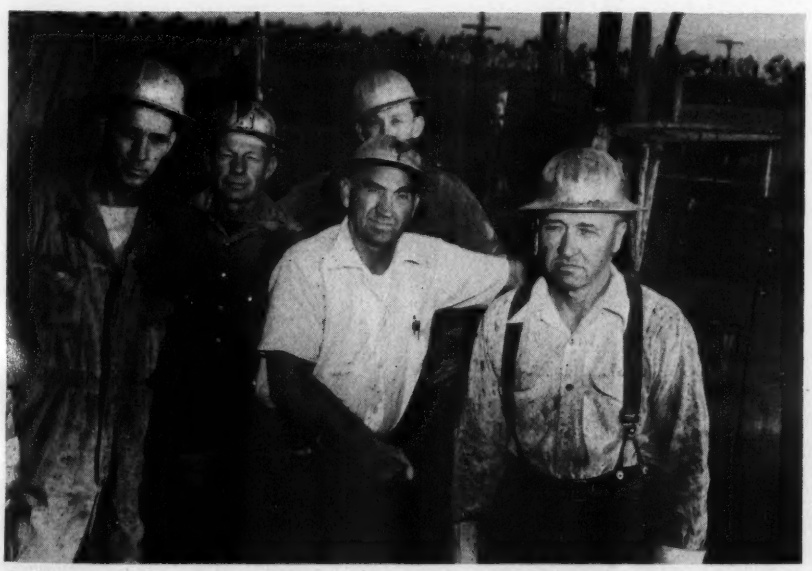
Placerita Well Pumps

Pumping between 10 and 15 barrels of net 13 gravity oil a day, the George D. Rowan, Operator, Phillips No. 11 on Section 6-3n-15w in the Newhall Placerita field has been completed at 1198 feet. In the Huntington Beach field, Clark C. Peterson's Wilson-Peterson No. 3 on Section 11-6s-11w is in from 5294 feet for 238 barrels of 27 gravity oil and 320,000 cubic feet of gas daily. In use was a 32/64-inch choke. The Texas Company NCT-1 No. 19 on Section 6-4n-16w in the Honor Rancho field is drilling at 2500 feet.

Sunray Oil Corporation's RSF 11B-7 being drilled by a company crew in the Newhall-Potrero field. Left to right: Wally Barringer, floorman; L. M. Combs production superintendent; Billy Atkins, derrick; Corky Lee, floorman; Arlo Creswell, head well puller and Ray Cantrell, floorman.

Oxnard Test Drilling Up

Ventura County's Oxnard area continues to attract new test drilling. The latest test staked is Merchants Petroleum Company's Socal - Hartman No. 1 on Section 22-1n-22w, southwest of Oxnard. On the subject of Oxnard, the extension of the deeper zones there qualifies as one of the outstanding field events of 1954. Since the discovery well was completed in July of 1953 on the Blanche Rice McInnes property seven wells have been put down and placed on production as extension of the find. McInnes No. 1 was bottomed at 9401 feet. However, mechanical troubles resulted in cementing-off at 6375 feet yield being pumped from a zone around that depth. Other production is flowing from between 8900 and 10,200 feet, with crude oil testing 32 degrees gravity and gas volume as high as 500,000 cubic feet daily from each well. Lloyd-Livingston No. 1, bordering the McInnes lease, was the second well to go on production. Next in line was McInnes No. 2, Borchard No. 1 ,Thatcher No. 301, Lennox No. 301 and Todd No. 301.



Dunlap & Graham is the drilling contractor on Standard Oil of California's Todd 301 at Oxnard. Left to right: Clyde Van Bebber, racker; Mark Wilburn, derrick; H. H. Martin, driller; E. L. Clay, lead tong. (Back) Ernest Lewis, cathead.

Sespe Wildcat Goes Off Board

The Division of Oil and Gas has reported the official abandonment of the Pacific Supply Cooperative, Inc., Nathan No. 1 wildcat' Sespe. The well, on Section 23-5n-20w, quit drilling at 4014 feet.

South Mountain Adds Producer

One of the best producing wells ever completed in the South Mountain field was Union Oil Company's Culbert No. 17 on Section 19-3n-20w, Ventura County. Guided to success by Rushing Drilling Company, the well started off from a total depth of 5887 feet flowing at the rate of 885 barrels of 22.2 gravity oil a day. Yield at last reports was 378 barrels of oil and 102,000 cubic feet of gas daily. At South Tapo, the company's Simi No. 21-12 on Section 12-3n-18w is in at 2620 feet for 243 barrels of 32.5 gravity oil and 146,000 cubic feet of gas a day.

Ojai Well Written Off

Richfield Oil Corporation has registered an abandonment with its No. 74 wildcat on Section 14-4n-22w at Ojai. The project went to 1040 feet. In the Timber Canyon area, Richfield is drilling at an intermediate stage with Loel-Maxwell No. 2 on Section 18-4n-20w and Atlas Smith No. 2 on Section 14-4n-21w.

Wiley Dome Job Drilling

Standard Oil's wildcat in the Wiley Dome area keeps drilling below 2500 feet on Section 1-3n-19w, Ventura County. The project is known as Ventura Realty No. 1.

North Rincon Wildcat Scene

Preparative work is progressing on Intex Oil Company's Dabney No. 1 wildcat venture on Section 36-4n-25w in Ventura County's North Rincon area. General Petroleum's Edward No. 1 wildcat, starting on Section 19-4n-18w in the Piru area, is bent on going to at least 14,000 feet for a thorough test at that location.

Santa Cruz Test Going

Richfield Oil Corporation shortly will begin drilling its first wildcat well on Section 28-1s-29w on Santa Cruz Island in the Santa Barbara Channel. Coastal Drilling Company has been assigned to take the project down on the 22-mile-long island. The company has under lease 54,400 acres or the whole island, except for some 6800 acres at the eastern end. This well will mark the first drilling on Santa Cruz. However, there have been seven unsuccessful tests taken down on the nearby Santa Rosa Island. Santa Cruz lies 23 miles off the Santa Barbara coast.

Petrolia Try Works

On Section 15-1s-2w at Petrolia in Humboldt County, Brookline Oil Company's Caesar No. 1 wildcat is down 2873 feet and is apparently being acidized. At North Willows in Glenn County, Humble Oil's H. C. Frederickssen No. 1 on Section 16-20n-3w is fishing with present depth 12,480 feet.

Winters Gas Test Scheduled

Bandini Petroleum Company has location staked for its Griffin No. 1 on Section 1-8n-1w in the North Winters area of Yolo County. The project will drill on ground three-quarters of a mile northwest of Universal Consolidated Oil Company's Wallace No. 1 producer. On Section 7-8n-1e, E. A. Bender, veteran California operator, is preparing to put down Putthoff No. 1 wildcat in the East Winters area.

Oakview Test Set To Drill

In the Oakview area Hancock Oil Company is ready to whirl rotary on its Wadleigh No. 1 wildcat project on Section 30-4n-23w. It is situated only 450 feet from Amerada Petroleum Corporation's Wadleigh et al No. 1 test, drilled to 3414 feet for and suspended after swabbing the interval of 1065-1090 ft. for no recovery. A test of the interval of 2093-2132 feet showed 10 barrels of 32 gravity oil a day.

San Ardo Test Set In Motion

Three miles east of the southern border of Monterey County's San Ardo field, Sunray Oil Corporation has set in motion its Alexander No. 1 explorer on Section 15-23s-11e. Sunray is reported to have acquired a farmout from Standard.

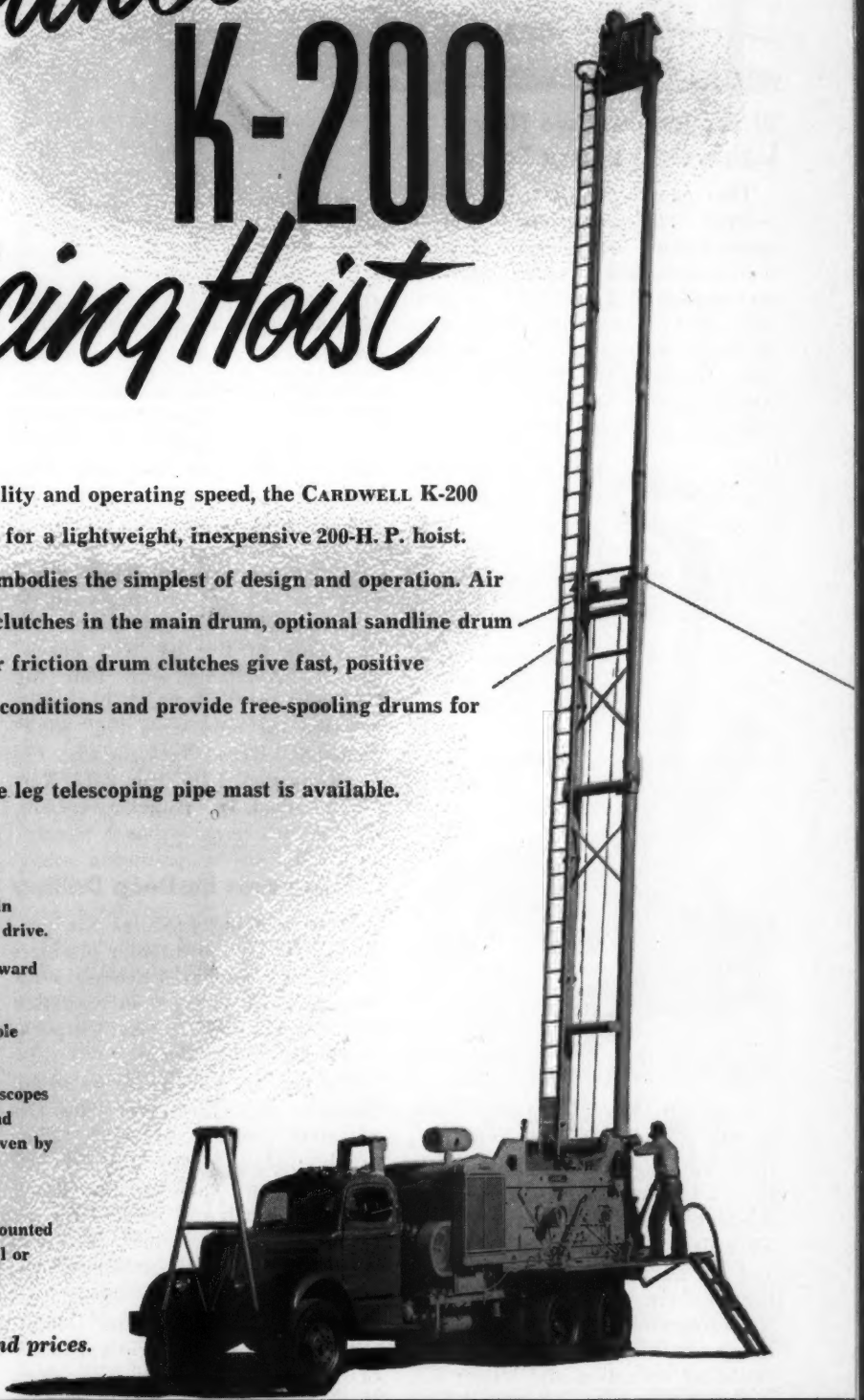
Sheffield Test Working

Exploratory drilling is moving ahead around 5000 feet with Monterey Oil Company's Shannon No. 1 project on Section 14-4n-2e at Sheffield in Monterey County. In the Newman area of Stanislaus County, Clarence W. Farmer of Central Counties Oil & Gas Corporation has abandoned his No. 1 wildcat on Section 6-7s-8e at 1065 feet. Another test may be taken down about three-fourths of a mile northeast of the abandoned well.

Superior Oil Company's NLF No. 2 being put down by a company rig near Newhall. Left to right: F. L. Grumbles, lead tong; E. F. Hoffman, driller; Jimmie Tomasi, derrick; Harold Huddleson, cathead and Robert Tidwell, racker.

CARDWELL

Announces the New K-200 Servicing Hoist



Designed for utmost mobility and operating speed, the CARDWELL K-200 servicing hoist meets your needs for a lightweight, inexpensive 200-H. P. hoist.

The design of the K-200 embodies the simplest of design and operation. Air controls operate the air friction clutches in the main drum, optional sandline drum and rotary drive. CARDWELL air friction drum clutches give fast, positive engagement under all operating conditions and provide free-spooling drums for fast dropping of the block.

A 65-foot or 55-foot double leg telescoping pipe mast is available.

FEATURES

CARDWELL air friction clutches in main drum, optional sandline drum and rotary drive.

Transmission provides four-speeds forward and one reverse to both drums.

Free-spooling drums, mounted on double row, self-aligning bearings.

65-foot or 55-foot double leg mast telescopes and folds over the hoist. Mast is raised and extended by line from winch which is driven by truck engine.

K-200 is available with GM 6031-C or Waukesha 145GKU engine, and can be mounted on a WC-2264 White, RF-195 International or 800-Ford truck.

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BJ Announces Two New Lightweight Rotary Tongs

Two new types of rotary tongs —Type "F" for blitz rigs, portable masts, water well rigs, production workover rigs and other light rotary work and Type "LF" for portable shot hole, exploratory, geophysical, water well rigs, production service and extremely light tong requirements—are now being produced by Byron Jackson Co.

Especially designed for lightweight rotary rigs, Type "F" is a light but rugged 3-jaw tong with jaws and lever of cast alloy steel, BJ-heat treated for extra strength. Threaded type hinge pins (1¼") and slotted nuts are used to prevent the female hinge section from spreading and bending the pin. All hinge surfaces are machined for smoother operation and longer life.

Positive latching is assured by a tee type latch with convex surfaces which contacts the concave lugs in the jaw and prevents the tong from unlatching when tonging. The popular BJ "Gooseneck" hanger with easy longitudinal and lateral adjustment makes for perfect suspension, giving perfect balance. Six Lug Jaw sizes provide a pipe-handling range from 2⅜" to 10¾". Approximate weight of Type "F" Tong is 178 lbs.

Type "LF" Tong is almost identical in construction except that it is considerably smaller and weighs only 115 lbs. Jaw and lever construction is the same as Type "F" and all hinge surfaces are machined.

The positive latching feature of this tong prevents unlatching when tonging. Perfect suspension is achieved with just two simple adjustments of the BJ "Gooseneck" hanger. Available with four lug jaw sizes, the Type "LF" Tong may be used for pipe sizes 2⅜" to 7" inclusive. Byron Jackson Co., Oil Tool Division, P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.

J&L Expands for Deep Drilling

New finishing facilities for producing oil country tubular products in the high strengths necessary for deep drilling are now in operation at Jones & Laughlin Steel Corporation's Aliquippa Works.

The new facilities make up an addition to J&L's Seamless Tube Department costing $4,700,000. They are housed in a new 100' by 725' steel structure with corrugated siding, built north and west of the 30-inch Seamless Round Mill and Seamless Tube Mill buildings.

The new structure, called the "Seamless Tube Specialties Department," is the first step in expansion of facilities for finishing high strength and special seamless tube products used in the oil industry. Further expansion of these facilities will come under J&L's plans for a $51,000,000 expenditure on this project and other projects in 1955.

In the new Specialties Department, equipment of J&L design makes possible finishing of seamless oil country casing and tubing by quench and temper heat treatment, imparting to these products characteristics that formerly were attained through adjustments in the chemical composition of the steel.

By speeding up and improving the finishing facilities, the new installation will tend to increase the total output of J&L high-strength seamless pipe.

The new process also will result in savings of many tons annually of strategic alloying materials — manganese, molybdenum and chromium — formerly used in steels for high strength seamless pipe.

The heat-treating equipment consists of two hearth-type mechanically-operated gas-fired furnaces, with a water-spray quenching unit between them. One furnace is a high-temperature furnace. The other is a tempering furnace.

Processing of the various products may involve normalizing, or normalizing and tempering, of alloy steels; or quenching and tempering of plain carbon steels.

The seamless pipe, produced in the existing mills, will come to the new department on new 15-ton side-operated lift trucks.

When normalizing, the pipe passes through the high temperature furnace. By controlled heating and cooling through the transformation range of the steel, the grain structure is refined and made uniform.

When quenching, the pipe is first heated in the high temperature furnace above the upper transformation temperature. Then it passes through the quenching unit, where it is water-sprayed with high- pres-

sure injector-type nozzles. Quenching hardens the steel.

Then the pipe passes through the tempering furnace. By gentle reheating, tempering restores to the quench-hardened steel the desired degree of ductility and toughness.

The hearth-type furnace and the quenching unit are unique with J&L.

Furnaces of this design provide uniform and efficient heating, and are able to process a wide variety of tubular products.

The J&L-designed quenching unit, in which the pipe passes longitudinally through radially-directed water sprays, gives a more effective quenching action than existing units, according to J&L technical personnel. This has been accomplished by lengthening the quenching unit, making it possible to run the pipe through at greater speeds.

Co-operating in the design of the unit were J&L Research, Technical Services, Production and Engineering Departments. The boiler shops at the Aliquippa Works built the quencher.

Other equipment in the new building consists of a three-stand sizing mill for sizing the pipe to exact diameter; a rotary straightener; a gag-press straightener; cut-off and threading equipment for final finishing operations; pipe storage racks, fuel oil storage tanks, and an office.

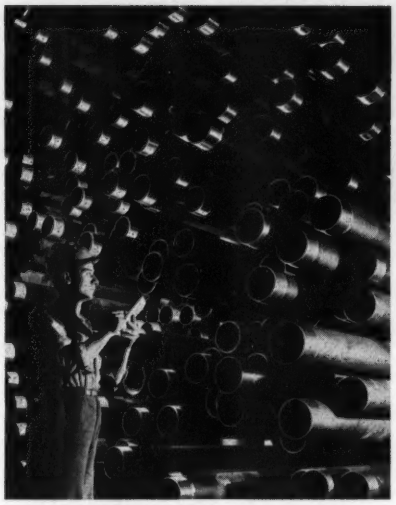
A 6,900-volt power line and substation building provide 60-cycle power to the new operations.

The facilities were installed because of oil country demands for an increasing proportion of high-strength pipe.

Since Drake completed his famous well on Oil Creek, in Venango County, Pennsylvania, in 1859, engineering ingenuity and technical advances in tubular products have helped oilmen bore into the earth's crust to a record depth of 21,482 feet.

This well is the Ohio Oil Company's 72-4 K.C.L. in Paloma Field, Kern County, California.

Deepest producing well is Richfield Oil Corporation's 67-29 Coles Levee A in North Coles Levee Field, Kern County, California. The well was completed in December, 1953, for 119 barrels a day from a producing zone between 17,500 and 17,892 feet.



Ready for shipment, this 9⅝-inch seamless tubing has been heat treated, sized, straightened and threaded. The tubing has a wall thickness of ⅜-inch and ranges from 18 to 45 feet. The man shown checking the pipe is Charles Psomas.

New well drillings in the first six months of 1954 were 8 per cent ahead of 1953, with 25,130 wells being sunk from January 1 to June 30. Oilmen expect the year's total to exceed 50,000 wells.

Average depth of wells has increased steadily over the past 11 years, according to the Oil & Gas Journal. Average depth now is over 4,000 feet.

Every deep well—that is, wells over 10,000 feet—makes terrific demands on drill pipe, casing and tubing. Because of the trend to deeper wells, and because of extraordinary requirements in off-shore drilling, the drilling industry now requires grades for oil country tubular goods with minimum yield strengths as high as 110,000 pounds per square inch.

The actual drilling of the well is performed by a bit threaded on the lower section of the drill pipe column. Mud of controlled composition is pumped through a rubber hose attached to the top of the string of drill pipe by a swivel arrangement. This mud is pumped down through the drill pipe, out the bottom and returns to the surface on the outside of the drill pipe. Purposes of the mud:

1. It removes the cuttings from the bottom of the hole which are allowed to settle out on the surface before the mud is recirculated.
2. It lubricates the drill pipe, reducing friction and abrasion due to contact with the rock formations through which the pipe rotates.
3. It serves as a seal to prevent blowing-out, due to oil or gas pressures in the well.
4. It helps prevent seepage or cave-ins.

Casing is provided in the well, outside the drill pipe, to prevent caving-in of the hole, and to seal off contamination from surface water or salt water.

After the well is completed, tubing is installed to bring the oil to the surface. If there isn't enough natural pressure, the well is pumped by means of a pumping mechanism placed in the tubing.

Heaviest demands are made on the drill pipe. This, at record depths, is a rotating column of joined sections of steel pipe, almost four miles long, transferring energy from the surface to the drilling bit at the bottom of the well.

Wells are seldom straight, and it is not uncommon for the hole to corkscrew or to be several hundred feet off the perpendicular, making a severe test on the mechanical properties of the drill pipe.

The casing must be strong enough to support its own weight, and to withstand internal and external pressures. In wells of record depth, the casing at the top of the well might be supporting 250 tons or more of casing below it. This would be approximately equal to the weight of 125 average size automobiles.

Internal pressure comes when the oil or gas areas are reached. This may exceed 10,000 psi. External pressure is due primarily to the weight of the mud column. A 10,000-foot mud column exerts a pressure of 5,000 psi or higher, depending on the density of the mud.

Tubing requirements are similar to those for casing. Where natural pressure is insufficient, a pumping mechanism is installed at the lower part of the tubing. Wear, vibration and corrosion limit the life of the tubing.

J&L has been making oil country tubular goods for over 30 years of its 101-year history. Besides seamless casing, tubing and drill pipe, J&L also makes seamless and welded line pipe, all at Aliquippa.

C. T. Hapgood is J&L's Manager of Tubular Products. Oil country pipe is sold through district offices and J&L's Supply Division, which operates stores in the United States and Canada handling a complete line of oil country materials and equipment. Rainey Elliott is General Manager of the Supply Division, with headquarters in Tulsa.

In the evolution of tubular goods for the oil country, J&L has pioneered in these other developments:

1. The integral joint for threading one section of pipe to another, as distinguished from the ordinary removable coupling. The integral joint reduces chance of leakage by half, and is stronger than the pipe itself.
2. "Blue Ribbon Steel" for drill pipe, which can be made in yield strengths to meet requirements of the deepest wells.
3. A chemical treatment of the threads at pipe joints to provide unusual lubricating characteristics, thus preventing thread damage.
4. Cement and plastic linings to protect pipe against corrosion.

Aluminum Derrick Introduced

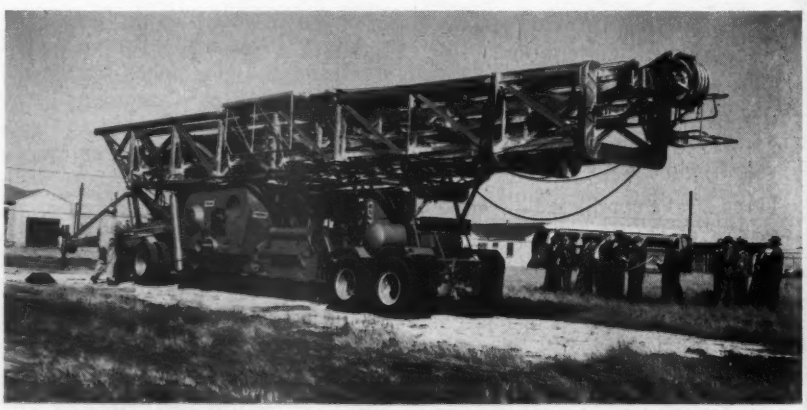
A first all-aluminum telescoping derrick for use on portable oil field servicing units has been perfected through the collaboration of the Franks Manufacturing Corporation of Tulsa, Oklahoma, and the Reynolds Metals Company of Louisville, Kentucky. The first such derrick has been built in the Franks Tulsa plant, and a demonstration held Friday, Nov. 5 in the Franks plant testing grounds was witnessed by officials of the Reynolds and Franks companies as well as representatives of major oil companies interested in the moving, rig-up and tear-down savings portable units offer.

This all-aluminum derrick is another in a series of Franks improvements to make oil well servicing units and drilling rigs 100 percent portable and yet stay within highway weight limitations, according to Carl White, Jr., president of the Franks company. White said that after a visit by representatives of the Reynolds company he and his engineers had considered aluminum derricks over a decade ago when looking around for lighter metals, but that welding of aluminum at that time had not been commercially successful. Later, when Reynolds engineers perfected the welding process, the two companies decided to collaborate on a telescoping derrick.

"Aluminum has been put to many uses, not only in reducing weight for comparable strength but for making possible higher speeds of airplanes as well, and we have been happy to cooperate in adapting aluminum for use in making equipment in the oil industry more portable," said Billy Reynolds, vice president of the Reynolds company.

For the utmost in strength and stability this new derrick is built of square tubing aluminum legs and bracings, and effects a saving in excess of 40 % in weight. Although it costs more at present than a steel derrick, Franks thinks more experience and mass production will soon bring the price down to a level competitive to steel. The derrick extends to over 100 feet, 96 feet under "water table", telescoping and folding to less than 60 feet over the vehicle for moving over highways from one well location to another. With a gross structural capacity of 600,000 pounds, there is a 3 to 1 margin of safety to handle 100 ton loads (200,000 pounds) continuously.

The use of aluminum in the manufacture of derricks is only one phase of Franks' efforts to perfect a well servicing unit which comes within highway weight limits. In the past two years Franks has developed a new type vehicle, especially designed as an oil well servicing unit and which would use the engine power plant to propel the unit over the highway. This unit, called Franks "CLIPPER", can now be equipped with this new aluminum derrick as an integral part. It has a 300 horsepower plant and is capable of servicing the deepest producing wells up to 15,000 feet. The Clipper will drill to 5,000 feet (normal capacity) with 3½ inch drill pipe, and is a most economical unit for "slim hole" drilling. It can be equipped with trailer mounted 100 percent portable substructure, pipe rack and runway, offering the greatest capacity for the least weight. Greater maneuverability, with the greater speed and accuracy of "spot-

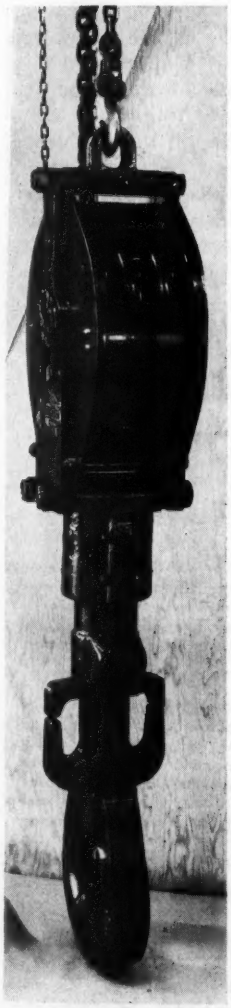


As first aluminum derrick was "spotted" and demonstrated to oil company and contractor executives in Tulsa recently. Note the roustabout at left setting the "out-rigger" stabilizer preparatory to the raising and extending of the telescoping derrick. The derrick is mounted on one of Franks Clippers and the aluminum saves 40 percent of the weight of a steel derrick. The derrick is the result of collaboration of Franks Manufacuring Corporation of Tulsa and the Reynolds Metals Company of Louisville, Kentucky.

ting" on location is another feature, as the unit heads in instead of backing in. The unit requires no guy lines to ground (only two lines to rear end of the vehicle necessary). The unit travels from location to location strung up. It is equipped with Franks' new full air clutch; and improved hardened brake rims.

The collaboration of the Franks Manufacturing Corporation with the Reynolds Metals Company in designing more aluminum into not only derricks but other components of oil field equipment will, according to White, go far toward literally putting the oil industry on wheels.

New Blocks Announced By Guiberson



Guiberson Type D324 Triple Sheave Block with Spring Triplex Hook.

A new line of 65 ton tubing blocks, designated Type D, is now in production by The Guiberson Corporation, Dallas, Texas. Built short and compact, these tubing blocks fall fast and won't foul up. Sheave bearings are heavy duty cylindrical roller bearings and hook bearings are heavy duty tapered roller thrust bearings.

The blocks are available with double or triple 24" sheaves grooved for ¼", ⅞" or 1" line and may be obtained with spring hook, spring duplex hook or spring triplex hook. The hook swivels freely or locks in any one of eight positions and is especially engineered for space saving and safety. With a factor of safety 3 to 1 on yield point, all blocks are well within A. P. I. specifications. This line of 65 ton tubing blocks supplements the line of 40 ton Type D single and double 18" sheave tubing blocks with swivel becket recently announced by Guiberson.

Standard to Build Refinery In Hawaiian Islands

Plans for construction of the first complete modern oil refinery in the Hawaiian Islands were announced recently by R. G. Follis, Chairman of the Board of Standard Oil Company of California.

The announcement was made as members of Standard's Board of Directors met in Honolulu for the first time in the history of the Company.

Follis said that the refinery will be built in the very near future, and will be located in Honolulu.

"We have been trying for some time to find a site which will be suitable," Follis commented, "but have not yet made a decision as to its location. We must have a location with an ample supply of fresh water, one which is large enough to accommodate the necessary processing and storage facilities, and which is accessible to both deep water ships and to other means of transportation.

The refinery we have in mind will be of sufficient size to supply most of the needs of the Islands, capable of processing between 20,000 and 30,000 barrels of crude oil daily. We estimate that a plant of this size will cost between $25,000,000 and $30,000,000 to build here."

Follis stated that the economy of the Islands will be helped by the payrolls and requirements for supplies in many lines which will be inherent in the operation of a plant of this size. He estimated that the effect on employment, directly and indirectly, would result in several hundred permanent jobs.

Products which can be manufactured in a plant of this kind include two grades of gasoline, gas oils such as diesel fuel, and fuel oil of the type burned in many of the Islands power-generating plants.

This meeting of Standard's Board of Directors in Honolulu marked the 50th anniversary of the establishment of the Company's first distributing plant in the Islands, in 1904. However, Standard products have been sold and used there since the days of 1800's, when principal products were kerosene, axle grease and candles.

Over the years since those early days Standard has continued to be a major supplier of petroleum products, and today stands as one of the Island's oldest and largest suppliers.

Other members of Standard's Board of Directors who accompanied Follis to Honolulu for the meeting were: T. S. Petersen, President of the Company; Hillyer Brown, F. S. Bryant, H. D. Collier, G. A. Davidson, A. N. Kemp, Gage Lund, Atholl McBean, E. J. McClanahan, Robert W. Miller, and Paul Picott. Also in Honolulu for the meeting were G. M. Foster, Secretary of the Company, and G. Stewart Brown, Director of Public Relations.

Corning Gas Test Abandoned

Slick Oil Company, Ltd., of Texas, has abandoned its first test on undeveloped holdings of Buttes Gas & Oil Company, Ltd., in the Corning gas area of Tehama County. Some weeks ago Slick entered into an operating agreement with Buttes calling for the development of the Eocene and Cretaceous below the Tehama formations which Buttes' present wells are tapping. Terms of the pact gave Buttes an overriding royalty of 50 per cent of the net profits from the outcome from each horizon. Slick assumed all costs associated with exploration and development of the properties and cost of dry holes previous to a discovery is borne by the Texas operator. In the Jelly Bend area, Continental Oil's Western Gulf-USL No. 1 wildcat on Section 24-29n-3w is drilling not much above 8000 feet.

LAUGH

One Sunday afternoon little Jimmy was getting acquainted with the lady who had come to visit and whom he had never seen before. "So you're my grandmother, are you?" he asked.

"Yes," she replied sweetly, "on your father's side."

"Well, I'll tell you one thing right now," Jimmy stated emphatically, "you're on the wrong side."

Three year old Bobby was being quizzed by his uncle.

"Does your father ever spank you?" he asked.

"Yes," replied Bobby.

"How about your mother?" his uncle persisted.

"Oh, she spanks me, too," Bobby answered.

"Who hurts the most?" his uncle asked.

THIS

"I do," was the simple reply.

Little Billy had gone out in the yard to bring the kittens in.

Suddenly, his father heard some shrill meowing. "Don't hurt the kittens!" he shouted to his son.

"Don't worry, Dad," Billy said. "I'm carrying them by the stems."

Little Gloria admired the beautiful golden tresses of the teen-ager next door.

One day she approached her neighbor timidly and asked, "Miss, will you please give me the recipe for your hair?"

"Do fishes really travel in schools?" Danny asked.

"Yes," his dad replied.

"Gee," the boy said, "I bet they're happy when the teacher gets hooked."

OFF!!

Little Bill was taking his first piano lesson. Suddenly he discovered there were pedals on the piano. His teacher was showing him how a musical composition should be played when he pulled gently at her sleeve and asked, "When do I put on the brakes?"

Little Kenny was visiting his bachelor uncle and was asking him the usual questions.

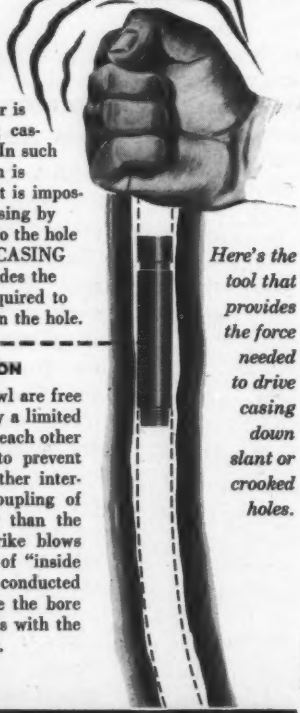
"Do you have a mother?" the little boy asked. "No, she died some years ago," his uncle answered gravely.

"Do you have a wife?" the boy persisted.

"No, son, I don't," was the genial reply.

"But, then," Kenny asked seriously, "who tells you what to do?"

the BOWEN CASING THUMPER



The Bowen Casing Thumper is indispensable for landing casing in slant holes. In such holes so much friction is encountered that it is impossible to land the casing by simply lowering it into the hole and the BOWEN CASING THUMPER provides the additional force required to drive the casing down the hole.

Here's the tool that provides the force needed to drive casing down slant or crooked holes.

SIMPLE CONSTRUCTION

The Mandrel and Bowl are free to move longitudinally a limited amount in relation to each other and are packed off to prevent fluid leakage from either internal or external pressure. The coupling of the tool is smaller in diameter than the Bowl insuring the ability to strike blows should the Bowl stick. All types of "inside the casing operations" can be conducted after the string is landed because the bore through the Thumper corresponds with the internal diameter of the casing.

Write for descriptive literature.

SR BOWEN CO

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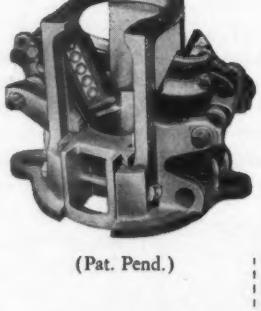

(Pat. Pend.)

Air-powered TUBING SPIDER

(A Cavins Co. Product)

Two of the many reasons why you will be glad to own an

Advance **TUBING SPIDER**

1 **Safety:** The Spider is equipped with a manually operated safety latch which may be used to positively lock the slips in their closed position.

2 **Allows Stripping:** Slip design and low working pressure allow operator to strip tubing and collars up through the slips while they are in closed position. Also the slips cannot be accidentally thrown away from the tubing if the tubing should part or slide.

Bulletin TS-54 tells the whole story.
We invite you to send for your copy.

Advance Oil Tool Co.

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